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ABSTRACT

The typical teaching techniques used by post secondary faculty in vocational technical institutes were identified and assessed to determine how helpful students felt these techniques were for their learning. Two surveys were conducted. One form was distributed to the faculty and the other to students of the six vocational technical institutes in Maine. An analysis of 167 faculty responses showed that the most frequently used techniques were lecture, written examinations, demonstration, homework, and practical examinations. Differences were found on certain techniques when the responses were compared by age, personality type, program, and types of teaching. Based on 1400 student responses, the results indicated that students preferred "hands on" experiences and interactive techniques. Differences in how students valued the teaching techniques were apparent when responses were grouped according to learning style and demographic variables. A comparison of teacher and student views showed that there is agreement that "hands on" type of experiences are very effective, and students rate as helpful in the learning process the most frequently used techniques by the faculty. (This report contains forty-four data tables. Both survey forms and the examples of successful and innovative teaching practices listed by the faculty are appended.) (EM)

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FINAL REPORT

COMPARISON OF TEACHING LEARNING TECHNIQUES BY TEACHERS AND STUDENTS OF VOCATIONAL TECHNICAL INSTITUTES

RESEARCH PROJECT

Conducted under
Part C of Public Law 90-576

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March 1, 1978

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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The project reported herein was performed pursuant to a grant from the Bureau of Vocational Education, Maine Department of Educational and Cultural Services. Grantees undertaking such projects under State Department sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions do not, therefore, necessarily represent official Department of Educational and Cultural Services position or policy.

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TABLE OF CONTENTS

LIST OF TABLES AND FIGURES	1
SUMMARY	3
INTRODUCTION	5
GOALS AND OBJECTIVES	7
METHOD	8
SAMPLE	8
INSTRUMENTS	9
DATA ANALYSIS	13
FACULTY TEACHING STYLES	14
SAMPLE	14
INSTRUMENTS	19
RESULTS	20
BY TOTAL GROUP	20
BY FACTOR STRUCTURE	22
BY HOLLAND'S THEORY	24
BY YEARS OF TEACHING EXPERIENCE	27
BY YEARS TAUGHT AT VTI	32
BY PROGRAM CLASSIFICATION	36
BY MOST SUCCESSFUL TEACHING TECHNIQUES	41
ADDITIONAL TEACHING TECHNIQUES	41
SUCCESSFUL TEACHING TECHNIQUES	44
INNOVATIVE PRACTICES	44

TABLE OF CONTENTS continued

STUDENTS' VIEW OF TEACHING/LEARNING STYLES	45
SAMPLE	45
INSTRUMENT	50
RESULTS	53
BY ATTITUDE TOWARD INSTRUCTIONAL TECHNIQUES	53
BY SEX DIFFERENCES	58
BY AGE DIFFERENCES	61
BY MARITAL STATUS	64
BY WORK STATUS	67
BY VTI DIFFERENCES	70
BY SEMESTER OF ATTENDANCE	73
BY CAREER MATURITY INVENTORY ATTITUDE SCALE	76
BY LOCUS OF CONTROL	88
BY WORK ENVIRONMENT PREFERENCE SCHEDULE	91
BY HOLLAND'S SIX TYPES OF PERSONALITY	103
BY GRADE POINT AVERAGE	107
OTHER HELPFUL LEARNING STYLES	110
MOST EFFICIENT AND EFFECTIVE LEARNING STYLE	112
COMPARISON OF TEACHERS AND PUPILS PERCEPTIONS	115
CONCLUSIONS AND RECOMMENDATIONS	119
APPENDIX A TEACHER FORM	132
APPENDIX B STUDENT FORM	136
APPENDIX C SUCCESSFUL TEACHING EXAMPLES	140
APPENDIX D INNOVATIVE TEACHING PRACTICES	150

TABLE OF CONTENTS continued

APPENDIX E	OTHER LEARNING STYLES HELPFUL TO STUDENTS	161
APPENDIX F	MOST EFFICIENT AND EFFECTIVE STYLES	163
APPENDIX G	HOLLAND'S SIX PERSONALITY TYPES	165
APPENDIX H	BIBLIOGRAPHY	169

TABLES AND FIGURES

TABLE 1	REPRESENTATION OF VTIs IN SAMPLE	15
TABLE 2	BY YEARS OF TEACHING EXPERIENCE	16
TABLE 3	CLASSIFICATION OF SAMPLE BY HOLLAND'S SIX TYPES	17
TABLE 4	CLASSIFICATION OF SAMPLE BY GENERAL AREA	18
TABLE 5	MEANS AND STANDARD DEVIATIONS OF TECHNIQUES USED BY VTI FACULTY	20
TABLE 6	FREQUENCY DISTRIBUTION OF FACULTY TO TECHNIQUES	21
TABLE 7	VARIMAX ROTATED FACTOR MATRIX OF THE INSTRUCTIONAL TECHNIQUES QUESTIONNAIRE	23
TABLE 8	CHI SQUARE ANALYSIS OF MTHODS OF INSTRUCTION BY HOLLAND'S SIX TYPES	26
FIGURE 1	COMPARISON OF HOLLAND'S TYPES ON SEVEN SIGNIFICANT ITEMS	28
TABLE 9	ANALYSIS BY LEVELS OF TEACHING EXPERIENCE	29
TABLE 10	PROGRAMMED INSTRUCTION BY LEVELS OF TEACHING	30
TABLE 11	FIELD TRIPS BY LEVELS OF EXPERIENCE	31
TABLE 12	ANALYSIS BY LEVEL OF TEACHING EXPERIENCE AT VTI	33
TABLE 13	DRILL SESSIONS BY LEVELS OF TEACHING AT VTI	34
TABLE 14	STUDENT LED DISCUSSION BY LEVELS OF TEACHING AT VTI	35
TABLE 15	CLASSIFICATION OF FACULTY BY GENERAL CATEGORY	37
TABLE 16	COMPARISON OF TEACHING TECHNIQUES BY PROGRAM CLASSIFICATION	38
TABLE 17	RANK ORDER OF TEACHING TECHNIQUES REPORTED AS SUCCESSFUL	42
TABLE 18	ADDITIONAL TEACHING TECHNIQUES REPORTED	43
TABLE 19	DISTRIBUTION OF STUDENTS BY VTI	46

TABLES AND FIGURES continued

TABLE 20	DISTRIBUTION OF RESPONDENTS BY PROGRAM OF STUDIES	47
TABLE 21	FACTOR STRUCTURE OF WAYS OF LEARNING INVENTORY	51
TABLE 22	RESPONSES OF STUDENTS TO HELPFULNESS OF TECHNIQUES	54
TABLE 23	RANK ORDER OF INSTRUCTIONAL TECHNIQUES BY STUDENTS	57
TABLE 24	EVALUATION OF VTI STUDENTS TO TEACHING LEARNING TECHNIQUES BY SEX	59
TABLE 25	EVALUATION OF VTI STUDENTS TO TEACHING/LEARNING TECHNIQUES BY AGE	62
TABLE 26	EVALUATION OF VTI STUDENTS TO TEACHING/LEARNING TECHNIQUES BY MARITAL STATUS	65
TABLE 27	EVALUATION OF VTI STUDENTS TO TEACHING/LEARNING TECHNIQUES BY WORK STATUS	68
TABLE 28	DIFFERENCES TO TEACHING/LEARNING TECHNIQUES BY VTI	71
TABLE 29	EVALUATION OF VTI STUDENTS TO TEACHING/LEARNING TECHNIQUES BY SEMESTER OF ATTENDANCE	74
TABLE 30	BY INTELLECTUAL FACTOR OF CMI ATTITUDE SCALE	77
TABLE 31	BY DECISION FACTOR OF CMI ATTITUDE SCALE	79
TABLE 32	BY CMI ATTITUDE TOWARD WORK	82
TABLE 33	EVALUATION OF VTI STUDENTS TO TEACHING/LEARNING TECHNIQUES BY ATTITUDE TOWARD EVALUATION	84
TABLE 34	EVALUATION BY COGNITIVE STYLE	86
TABLE 35	EVALUATION BY LOCUS OF CONTROL	89
TABLE 36	BY SELF-SUBORDINATION DIMENSION OF WEPS	92
TABLE 37	BY IMPERSONALIZATION DIMENSION OF WEPS	94
TABLE 38	BY RULE CONFORMITY OF WEPS	97
TABLE 39	BY TRADITIONALISM DIMENSION OF WEPS	99

TABLES AND FIGURES continued

TABLE 40	BY TOTAL SCORE ON WEPS	101
TABLE 41	BY HOLLAND'S SIX TYPES OF PERSONALITY	105
TABLE 42	BY GRADE POINT AVERAGE	108
TABLE 43	MOST EFFICIENT AND EFFECTIVE LEARNING STYLES LISTED BY VTI STUDENTS	113
TABLE 44	COMPARISON OF COMMON ITEMS BY TEACHERS AND STUDENTS	116

SUMMARY

The Comparison of Teaching/Learning Techniques by Teachers and Students of Vocational Technical Institutes was a research project funded under Part C of Public Law 90-576. The project started January 30, 1977 and was completed March 1, 1978.

The goal of the project was to analyze and determine the typical instructional mode used by post-secondary faculty in the vocational technical institutes. The following were the specific objectives of the program:

1. to identify the different types of teaching techniques which were used by instructors in the vocational technical institutes by program area
2. to assess how helpful students felt these techniques are
3. to evaluate the student opinion of instructional techniques by the student's type of program or major, achievement level, semester of attendance, learning style, sex and locus of control

Two surveys were conducted. One form was distributed to the faculty and the other to students of the six Vocational Technical Institutes in the state of Maine.

One hundred sixty-seven faculty members responded to the questionnaire. The responses were analyzed by the total sample, program area, Holland's types of personality and years of teaching experience. The most frequently used techniques were lecture, written examinations, demonstration, homework and practical examinations. Differences were found on certain techniques when the

responses were compared by age, personality type, program and years of teaching. The examples of successful and innovative teaching practices listed by the faculty are included in the report.

About 1,400 students responded to a similar questionnaire. The responses were analyzed by type of program, achievement level, semester of attendance, learning style, locus of control, work status, attitude toward evaluation and sex membership. Students preferred "hands on" experiences and interactive techniques. The differences were found between groups on preference for instructional techniques in learning style and other demographic variables.

The student and faculty responses are compared and similarities and differences discussed. Recommendations are listed for inservice programs and future research projects.

INTRODUCTION

Many models have been recently developed to provide an interpretive framework of the teaching process. Nuthall and Snook (1973) have identified three major models: The Behavior-Control Model, The Discovery-Learning Model and the Rational Model. The former is a stimulus-response view of teaching and incorporates programs such as programmed instruction and behavior modification. The discovery-learning model places emphasis on the self-directed activity of the student. The rational model has a philosophic basis and states that the practice of teaching must be influenced by the logic of agreement and justification.

The theoretical models have to be translated into the practical realities of organization and implementation of course content. There have been a number of studies which have looked at teaching methods in vocational technical schools (Finch, 1969; Tuckman, 1968; Oliver, 1967). These studies, however, have focused primarily on single types of teaching models in limited subject areas. Vocational teachers are at liberty to employ many different methods of instruction in their courses.

There are many dimensions to teacher performance. Borich and Fenton (1977) identify three forms of teacher competencies: (1) knowledge competencies, specifying cognitive understandings the teacher is expected to demonstrate, (2) performance competencies, specifying teaching processes the teacher is expected to demonstrate and (3) consequence competencies, specifying pupil behaviors that are viewed as evidence of teaching effectiveness.

One way of attempting to assess the current status of teacher performance is to have teachers report on how they view different types of teaching processes and to see how students view these also.

Costin et. al. (1971) concluded in their review of research, that student ratings can provide reliable and valid information about the quality of both courses and instruction.

Much attention has recently been focused on the learning style of the student and the teaching style of the teacher. Again, much of this research has been limited to specific courses rather than across a number of courses, and has rarely been conducted on groups in vocational and technical education.

Ashmun and Larson (1970) pointed out the need for clarification in the area of teaching-learning techniques in order to improve the preservice and inservice education of vocational technical teachers as well as providing useful information about the programs to state departments of education.

The Research Coordinating Unit of the Bureau of Vocational Education, State of Maine in a memo dated October, 1976, requested among other studies "A study or series of studies to analyze and determine the typical instructional mode used by the post-secondary faculty in the vocational technical institutes."

GOALS AND OBJECTIVES OF THE PROJECT

The goal of this study was to assess what teaching techniques were utilized in the Vocational Technical Institutes in Maine and to see how helpful students felt these techniques were for their learning.

The specific objectives of this research project were:

1. to identify the different types of teaching techniques which were used by instructors in the vocational technical institutes by course and program.

2. to assess how helpful students felt these techniques are

3. to evaluate the student opinion of instruction by

   a. their program or major course of study

   b. their achievement level

   c. their semester at the VTI

   d. their learning style

   e. their sex

   f. their locus of control

METHOD

A cross-sectional study was conducted to compare different programs, schools and sets of students. The six Vocational Technical Institutes in Maine all participated in the study. Two survey forms were developed: one for faculty, the other for students.

The principal investigators presented the goals of the study to the directors and deans of the institutes at two regularly scheduled director's meetings. This presentation included an outline of the study and the proposed instrumentation.

A contact person, either the director, dean or a designate, organized the data gathering procedures and completed the data collection after discussing general guidelines with the investigators.

SAMPLE

Two groups of respondents were involved in the study. One hundred sixty-seven faculty members completed the first survey. Their median number of years in teaching was 8.5 of which 5.5 were spent at the post-secondary.

Fourteen hundred students responded to the second survey. The students represented 41 different program areas. The median age of the students was 19.7. Three-fourths of the sample were males, and approximately one-fourth females.

THE INSTRUMENTS

Two instruments were developed for the study. The faculty survey contained twenty-one types of teaching or instructional techniques commonly used in the vocational technical schools. The instructors were asked to indicate the frequency in which they used each technique on a four point scale from not used to frequently used. There was space alotted for instructors to add additional techniques not listed. There were three open-ended questions included. The first asked instructors to list in order of effectiveness the teaching techniques which have been most successful for them to use with students, where the students have learned effectively and they (the teachers) have been pleased with the results. They were also asked to describe a specific illustration of one of their successful teaching experiences. The third question asked them to describe any new or innovative methods they were using to teach a course or courses. A copy of the instrument and cover letter is included in Appendix A of the report.

The student form consisted of eight demographic questions such as program of study, age, gradepoint average, sex, number of semesters completed at VTI, their marital status, and their work status.

There were 39 items describing teaching learning techniques on which the students were asked to rate them on how helpful that particular way or technique was in assisting them to learn. They were asked to respond to each item on a five point scale from hinders or prevents learning to is extremely helpful. Two open ended questions were also asked: The first, what other learning styles were helpful to them and the second, what was the most effective and efficient learning style for them.

The third part of the questionnaire varied. Five instruments were included. The Attitude Scale from the Career Maturity Inventory (Crites, 1973), The Work Environment Preference Schedule (Gordon, 1973) and Locus of Control Scale (Rotter, 1966), The Attitude Toward Evaluation Scale (Costin, 1971) and the Cognitive Style Preference Scale (Drummond and McIntire, 1977). The order was randomized in five of the six institutes for the first three instruments listed so that testing time would be at a minimum. At one of the institutes,the third part consisted of the last two instruments listed.

The instrument was based upon Ways of Learning (Drummond, 1973), an instrument used to assess student reaction to teaching learning activities in schools. The items were modified to reflect the techniques used in the VTIs and to correlate with the items included on the instructor's scale. A copy of the questionnaire is included in Appendix B.

The Attitude Scale (Crites, 1973) consists of fifty True-False statements in both the first and third person. The items cover involvement in career choice, orientation toward work, independence in decision making, preference for career choice factors and conceptions of the choice process. The mean internal consistency coefficient for samples of students grades 6 to 12 was .74.

The Work Environment Preference Schedule (Gordon, 1973) contains 24 items in which the respondent is asked to respond on a five point scale, strongly agree to strongly disagree. There are four dimensions covered on the instrument. The self-subordination scale assesses the extent to which individuals agree that persons at the higher levels are in the best position to make descisions

for people below them and the degree to which a person owes loyalty to his institutional superiors. The impersonalization scale describes the extent of an individual respondent's agreement with the concept that relationships within an organization should be based on position and level rather than on personal considerations.

The rule conformity items assess the extent to which a person is committed to following rules and regulations exactly, while the traditionalism dimension measures a subject's commitment to expressing feelings about the organization that conform to those of his/her colleagues.

Gordon (1973) reported internal consistency reliabilities for the total scale ranging from .83 to .91.

The Internal/External Scale (Rotter, 1966) consists of 29 paired comparisons. Internal statements are paired with external statements. Subjects are asked to select the one statement from each pair which best represents how they feel. One point is given for each external statement selected. Scores can range from zero (most internal) to a high of 23 (most external.) If persons believe that the event is contingent upon their behavior or their own relatively permanent characteristics, they are internal. If they believe the event is the result of luck, chance or fate or under the control of others, they are external. The test retest reliabilities ranged from .60 to .83.

The Attitude Toward Instruction Scale (Costin, et. al., 1971) consists of 9 items relating to student attitude toward teachers and program evaluation. The respondents are asked to rate the items on a five point scale, strongly agree to strongly disagree. An example of several items are: Ratings are a waste of time, I would like to spend time outside of class to rate courses and student evaluation of instructors will affect the instructor's future teaching performance.

The Cognitive Style Preference Inventory (Drummond and McIntire, 1977) is a six item inventory relating to students' preference toward instructional techniques. The students are asked to react to each item on a five point scale from strongly agree to strongly disagree. The items were selected because they differentiated between field independent and field dependent students. Field dependent individuals are more responsive to social aspects of their environment. Field independent students are able to perceive and evaluate their environment in a relatively analytical manner, less interested in the social aspects and more concerned with the mastery of tasks they are performing.

The instructors were classified into one of Holland's six personality types, using just the single letter major code. Likewise, the programs of study for the students were classified similarly. Holland (1973) postulated that the choice of a vocation is an expression of personality. He states that because people in a vocational group have similar personalities they will respond to many situations and problems in similar ways and that they will create characteristic interpersonal environments. He continues and states that people search for environments that will let them exercise their skills and abilities, express their attitudes and values and take on agreeable problems and roles. In Appendix G the six personality types of Holland are described. The responses on the teachers' and students' questionnaires were compared by types.

DATA ANALYSIS

The responses to the instructor's survey were coded and then key punched. The crosstabs program of the Statistical Package for Social Science (Nie, 1975) was used to compare the item responses against the variates of program, years of teaching experience, and classification by Holland's six types. The frequency program was run to provide the basic descriptive data of usage of the techniques listed.

The techniques added were categorized and summarized. The successful teaching techniques were also catalogued and categorized. The illustrations of successful teaching techniques and innovative practices are included in Appendix C and D of the report.

The responses to the student survey were recorded on IBM 1230 answer sheets by the students. The demographic data were coded in the ID Box. Cards with the item responses were punched by the scanner. The Breakdown and Oneway programs were used to compare the means of the various groups to items on teaching/learning techniques by the variates such as age, sex, grade point average, work status, marital status.

The tests included in the third section of the questionnaire, the Locus of Control Scale, Career Maturity Index, Work Environment Preference Schedule, Attitude Toward Evaluation and Cognitive Style Preference Scale were scored and then recoded into three groups: a high group, an average or a medium group, and a low group. The cut off points were approximately the 75 percentile for the high group and the 25 percentile for the low group. The average or medium group consisted of the middle fifty percent.

The data were processed by the IBM 370-148 computer of the University of Maine System.

FACULTY TEACHING STYLES

THE SAMPLE

One hundred and sixty-seven faculty members from the six Maine Vocational Technical Institutes responded to the survey. The breakdown of the sample by institution is presented in Table I. Southern Maine had the largest group, 74 or 44.3 percent. Eastern Maine was represented by 29 (17.4%); Northern Maine had the highest representation with 28 or 16.8%. Washington County had 18 or 10.8% and Central Maine 12 or 7.2%. Six of the Kennebec Valley instructors responded representing 3.6% of the sample.

The group varied in teaching experience. The range was from just starting in teaching to 35 years of experience. The median number of years teaching was 8.5; the mean was 9.7 years. The median number of years taught on the post secondary vocational technical level was 5.5; the mean was 7.7 years. The distributions are presented in Table II.

The make up of the sample was analyzed in two ways. The teaching areas were classified using the six types identified in Holland's Theory of Vocational Development (see Appendix G). The breakdown by type is presented in Table III.

About one third of the faculty worked in investigative fields; 29% in social, 19% in realistic, 10% in artistic, 5% in enterprizing and 4% in conventional.

The sample was also grouped by general type of job categories. The distribution by areas is presented in Table IV. The largest group of respondents was the support services group, instructors who teach the English, Mathematics, science courses, etc. (29%). In the program categories, the largest representation was in the Health Services area (20%), then Electric/Electronics (08%), and Marine Related (07%). The automotive, business, building/construction trades, food services, and secretarial programs each represented approximately five percent of the sample.

TABLE I

Representation of the Vocational Technical Institutes in Sample

Institute	Frequency	Percent
Central Maine	12	7.2
Eastern Maine	29	17.4
Washington County	18	10.8
Northern Maine	28	16.7
Southern Maine	74	44.3
Kennebec Valley	6	3.6
Total	167	100.0

TABLE II

Teachers of Vocational Technical Institutes
by Years of Teaching Experience

Years	Frequency of Teachers By Total Years In Teaching	By Years Taught at VTI
35-39	1	0
30-34	2	3
25-29	5	0
20-24	10	2
15-19	18	3
10-14	42	34
5-9	36	50
0-4	53	75
N	167	167
Range	0-35	0-31
Mean	9.7	7.1
Median	8.5	5.5

TABLE III

Classification of Sample by Holland's six types

Type	Frequency	Percent
Realistic	31	19
Investigative	56	34
Artistic	17	10
Social	48	29
Enterprising	8	05
Conventional	7	04

N=167
%=100

TABLE IV

Classification of Sample by General Areas

Area	Frequency	Percent
Automotive and related	8	05
Business	8	05
Building Trades	11	07
Electric/Electronics	13	08
Environmental	7	04
Food Services	8	05
Health Related	33	20
Industrial Related	9	05
Marine Related	12	07
Law Enforcement	2	01
Secretarial	7	04
Support Services	49	29
Drafting	6	04
English/Communications	12	07
Math/Science	19	11
Learning Resources	5	03
Social Sciences	5	03
Physical Education	2	01
TOTAL	167	

INSTRUMENTATION

The respondents were asked to complete a two page questionnaire. There were twenty-one items relating to the types of teaching techniques. The instructors were asked to respond to each on a four point scale: (1) not used, (2) seldom used, (3) moderately used, and (4) frequently used. There was a space provided for them to include other techniques not listed in the original list. In addition, there were three open ended questions included:

1. What teaching techniques have been most successful for you to use in which students have learned effectively and you have been pleased with the results?

2. Please describe a specific illustration of one of your successful teaching experiences:

3. Are you trying any type of new or innovative way of teaching a course or courses? Please describe the technique or approach you are using.

A copy of the instrument is included in Appendix A of this report.

THE RESULTS

The responses of the combined group to the first 21 items are presented in Tables V and VI. The means and standard deviations are presented in Table V and the distributions are presented in Table VI. The five techniques with the highest mean ratings are lecture (3.68), Written Examinations (3.60), Demonstrations (3.49), Homework (3.42) and Practical Examinations (3.33). The five techniques having the lowest means were Computer Assisted Instruction (1.06), Panel Presentations (1.48), Instructional T.V., Video Tape (1.52), Recitation (1.84) and Programmed Instruction (2.03).

Lecture method was the most frequently used technique (73.7%). Written Examinations were second (69.5%). Laboratory Shop techniques were third with 67.3% followed by Demonstration with 58.7. Practical Examinations and Homework were reported frequently used by 54.5%.

TABLE V
Means and Standard Deviations of Techniques
Used by VTI Faculty

Technique	Mean	SD	Rank
Lecture	3.68	0.603	1
Written Examinations	3.60	0.724	2
Demonstration	3.49	0.719	3
Homework	3.42	0.760	4
Practical Examinations	3.33	0.942	5
Laboratory/Shop	3.29	1.148	6
Discussion, Teacher Led	3.22	0.721	7
Review Sessions	3.03	0.753	8
Individualized Instruction	2.98	0.917	9
Slides/Filmstrips/Films	2.78	1.008	10
Discussion, Student Led	2.45	0.870	11
Library or Research Papers	2.43	0.945	12
Peer Teaching	2.31	0.960	13
Independent Study	2.30	0.923	14
Drill Sessions	2.15	1.103	15
Field Trips	2.12	0.917	16
Programmed Instruction	2.03	1.094	17
Recitation	1.84	0.977	18
Instructional T.V./Video tape	1.52	0.934	19
Panel Presentation	1.48	0.777	20
Computer Assisted Instruction	1.06	0.374	21

TABLE VI

Frequency Distribution of VTI Faculty to Instructional Techniques

Technique	Not Used		Seldom Used		Moderately Used		Frequently Used		Missing
	N	%	N	%	N	%	N	%	%
Lecture	2	1.2	6	3.6	35	21.0	123	73.7	0.6
Discussion, Student Led	23	13.8	57	34.1	62	37.1	17	10.2	4.8
Discussion, Teacher Led	5	3.0	13	7.8	86	51.5	60	35.9	1.8
Panel Presentation	106	63.5	36	21.6	13	7.8	5	3.0	4.2
Drill Sessions	60	35.9	33	19.8	38	22.8	23	13.8	7.8
Review Sessions	4	2.4	31	18.6	83	29.7	45	26.9	2.4
Slides/Filmstrips/Films	21	12.6	42	25.1	54	32.3	49	29.3	0.6
Programmed Instruction	70	41.9	41	24.6	27	16.2	24	14.4	3.0
Recitation	75	44.9	46	27.5	22	13.2	14	8.4	6.0
Demonstration	4	2.4	9	5.4	52	31.1	98	58.7	2.4
Instructional TV/Video Tape	116	69.5	21	12.6	14	8.4	12	7.2	2.4
Field Trips	48	28.7	59	35.3	45	26.9	11	6.6	2.4
Individualized Instruction	10	6.0	40	24.0	57	34.1	57	34.1	1.8
Computer Assisted Instr.	154	92.2	2	1.2	3	1.8	1	0.6	4.2
Independent Study	38	22.8	52	31.1	60	35.9	14	8.4	1.8
Homework	6	3.6	9	5.4	58	34.7	91	54.5	1.8
Library or Research Papers	35	21.0	42	25.1	70	41.9	18	10.8	1.2
Laboratory/Shop	27	16.2	5	3.0	19	11.4	105	67.3	6.6
Practical Exams	14	8.4	10	6.0	43	25.7	91	54.5	5.4
Peer Teaching	34	20.4	58	34.7	42	25.1	20	12.0	7.8
Written Exams	6	3.6	5	3.0	36	21.6	116	69.5	2.4

The two techniques used least involved the use of hardware which is not readily available at most VTIs. These were Computer Assisted Instruction and instructional T.V./Video tape. Panel Presentations were only used by about 1/3 of the group. Programmed instruction and Recitation were used by only about three fifths of the instructors.

A factor analysis of the twenty-one item questionnaire was run using the principle components method with varimax rotations. Six factors were identified which had eigen values greater than 1. The rotated matrix is presented in Table VII. The factors accounted for 58.9 percent of the variance. The first factor accounted for 19.1% of the variance and was labelled "concrete experience." Having high loadings on this factor were Laboratory/Shop, Demonstration, Practical Examinations. The second Factor accounted for 10.4% of the variance and was entitled "Interactive Learning." Discussion, Student Led; Discussion, Teacher Led; Panel Presentation, Library or Research Papers had significant loadings in this factor.

The third factor accounted for 9.5 percent of the variance and was called "Reinforcement or Practice Techniques." The three variables with significant loadings were Drill Sessions, Review Sessions and Recitation.

The fourth factor contributed 8% of the variance and was named "Traditional or Didactic" Lecture and Homework had high positive loadings; Drill and individualized Instruction had high negative loadings.

The Fifth Factor added 6.6% of the variance and was labelled "Untraditional or Innovative Learning." Instructional T.V./Video tape, Computer Assisted Instruction and Programmed Instruction had high loadings on this factor.

The sixth factor accounted for 5.4 percent of the variance and was "Participation." Written examinations had the highest loading on this factor, followed by Independent Study, Programmed Instruction.

TABLE VII

Varimax Rotated Factor Matrix
Of the Instructional Techniques Questionnaire

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Communality
Lecture	288	003	051	588	-268	004	504
Discussion, Student Led	112	640	138	-124	011	-018	457
Discussion, Teacher Led	097	427	165	273	169	-074	329
Panel Presentation	-039	571	353	154	154	124	517
Drill Sessions	037	015	635	-410	-257	123	655
Review Sessions	134	071	525	116	170	073	347
Slides/Filmstrips/Films	189	275	-143	012	242	363	322
Programmed Instruction	282	189	186	-238	385	349	477
Recitation	-034	221	588	181	-045	-119	445
Demonstration	694	027	037	132	-032	-028	503
Instructional TV	-032	196	-012	028	512	104	314
Field Trips	263	284	025	210	-011	180	228
Individualized Instruction	370	244	082	-417	247	-033	440
Computer Assisted Instruction	029	-142	026	-177	519	027	324
Independent Study	321	254	-075	001	313	373	411
Homework	-044	042	138	486	-014	228	311
Library or Research Papers	-048	693	-079	041	-013	180	523
Laboratory/Shop	870	084	-081	-170	047	177	834
Practical Examinations	676	088	158	075	055	177	530
Peer Teaching	212	434	094	-140	010	077	269
Written Examinations	081	033	063	149	-000	551	338
EIGEN VALUE	4.01	2.17	1.98	1.68	1.37	1.12	
PCT OF VAR	19.1	10.4	9.5	8.0	6.6	5.4	

Analysis of Teaching Techniques using Hollands' Theory

The faculty were classified by their teaching field using Holland's Theory of Vocational Choice. A chi square analysis was made of the items by the six types. There were significant differences in the distributions of the six types on seven of the items on the survey. Six were significant at the .001 level or beyond. One was significant at the .05 level. There were differences in how slides, filmstrips and films were utilized by the six types. Thirty-eight percent of the Realistic group used them frequently as compared to 21% of the Investigative, 6% of the Artistic, 50% of the Social, and 0% for the Enterprizing and Conventional groups. Thirty-eight percent of the Enterprising and twenty-nine percent of the Conventional and 35% of the Artistic group did not use slides or filmstrips and only 11% of the Investigative group.

There were also differences in how the six types utilized Demonstration. Eighty-seven percent of the Realistic group frequently used this technique as compared to 61% of the Investigative, 41% of the Artistic, 51% of the Social, 50% of the Enterprising and 57% of the Conventional. None of the Realistic or Conventional group reported seldom or not using demonstration. Thirty-eight percent of the Enterprising, 18% of the Artistic, 5% of the Investigative and 9% of the Social group reported not or seldom using Demonstration.

The third item with differences in the perceptions of the six groups was on the use of field trips. Fifty-five percent of the Realistic group made moderate or frequent use of field trips as compared to 46% of the Investigative, 6% of the Artistic, 17% of the Social, 38% of the Enterprising and 29% of the Conventional. Field trips were not used by 3% of the Realistic, 22% of the Investigative, 41% of the Artistic, 46% of the Social, 25% of the Enterprising and 71% of the Conventional.

There were differences also in the utilization of Individualized Instruction. Fifty-eight percent of the Realistic group made frequent use of individualized instruction as compared to 28% of the Investigative, 41% of the Artistic, 30% of the Social, 13% of the Enterprising and 29% of the Conventional group. Only 7% of the Realistic group reported using the technique as seldom or never as compared to 35% of the Investigative, 35% of the Artistic, 32% of the Social, 75% of the Enterprising and 29% of the Conventional.

The fifth item where there were differences in the distributions of the six groups was on the use of library or research papers. The group making the most frequent use was the Artistic group with 35% followed by the Social with 17%, Enterprising with 13%, Realistic with 7% and Conventional with 0%. Seventy-one percent of the Realistic group checked moderate use, similarly 50% of the Enterprizing group, 48% of the Social, 29% of the Artistic and Conventional and 26% of the Investigative. Seventy-two percent of the Investigative and Conventional teachers seldom or never used research papers as compared to only 23% of the Realistic group, 35% of the Artistic group, 35% of the social group, and 37% of the Enterprising group.

The use of Laboratory/Shop techniques also varied between the six types. Ninety-three percent of the instructors classified as realistic used these techniques frequently as compared to 71% for investigative, 50% for Artistic, 62% for social, 57% for Conventional and the low of 14.3% for Enterprising. Fifty-seven percent of the faculty classified as enterprising made no use along with 43% of those classified as Conventional and 38% of the Artistic.

The last item with significant differences was the item concerning Peer Teaching. The group making the most frequent utilization of peer teaching was the Realistic sample (46%). The second group was the Enterprising with 12.5%,followed

TABLE VIII

Chi Analysis of Methods of Instruction
By Holland's Six Types

Method	Chi Square	Significance
Lecture	22.17	.10
Discussion, student led	23.03	.08
Discussion, teacher led	10.46	.78
Panel presentation	15.78	.39
Drill session	23.73	.06
Review sessions	18.11	.25
Slides/filmstrips/films	61.11	.000
Programmed instruction	21.84	.11
Recitation	24.28	.06
Demonstration	38.58	.000
Instructional TV/video tape	13.08	.59
Field trips	41.97	.000
Individualized instruction	27.28	.026
Computer assisted instruction	8.08	.92
Independent study	24.43	.058
Homework	12.83	.61
Library or research papers	52.23	.000
Laboratory/shop	36.65	.001
Practical examinations	24.84	.052
Peer teaching	52.35	.000
Written examinations	23.29	.07

by the Investigative and Artistic with 6% and Social with 4%. None of the teachers classified as Conventional made either frequent or moderate use of this technique. All the Conventional group did not use or seldom used peer teaching. The second largest group of not using or seldom utilizing peer teaching was the Investigative group with 79% followed by the Artistic with 59%, Enterprising with 53%, Social with 53% and Realistic with 25%. (See Figure I)

COMPARISON OF METHODS USED BY YEARS OF TEACHING EXPERIENCE

The sample was divided into three groups at the upper and lower quartiles to see if there were any differences in methods of teaching used by years of teaching experience. The first group consisted of 44 faculty members and had teaching experience of 0 to 3 years. The middle group of 76 instructors had taught from 4 to 13 years. The third group were the most experienced teachers who had taught from 14 to 35 years. The results of the chi square analysis by levels of teaching experience is presented in Table IX.

There were significant differences on only two of the twenty-one methods by levels of teaching experience. Beginning level teachers with zero to three years of experience tended to make more use of programmed instruction than did the middle range and teachers with the most years of experience. Forty-two per cent of the teachers with zero to three years of teaching tended to use programmed instruction moderately or frequently as compared with 32% of the middle group and 18% of the upper group. See Table X.

The teachers with the mid range of experience (4 to 13 years) made more use of field trips than either the more experienced or least experienced teachers. The item breakdown is presented in Table XI. Forty-one percent of the middle group made moderate to frequent use of field trips as compared to 35% of the beginning teachers and 23% of the more experienced teachers. Forty-one percent of the most experienced group did not use field trips as a teaching method as compared to 36% of the beginning teachers and 16% of the middle group.

Figure I

Comparison of Holland's Types
On the Seven Significant Items

Technique	Realistic	Enterprising	Artistic	Investigative	Social	Conventional
Slides/Films	H	L			H	L
Demonstration	H	L	L	H		
Field Trips	H			H	L	L
Individualized Instruction	H	L	H	L		
Research Papers		H	H	L		L
Peer Teaching	H	H		L		L
Laboratory/Shop	H	L		H		L

H=High Usage

L=Low Usage

Note, realistic teachers made most frequent use of all techniques except research papers. Conventional teachers tended to make low usage of the techniques.

TABLE IX

Chi Square Analysis of Teaching Techniques
By Levels of Teaching Experience

Method	Chi Square	Significance
Lecture	1.67	.94
Discussion, student led	6.30	.38
Discussion, teacher led	2.82	.83
Panel Presentation	9.13	.16
Drill session	6.56	.36
Review sessions	2.41	.87
Slides, filmstrips, films	10.72	.09
Programmed instruction	16.97	.009
Recitation	8.45	.20
Demonstration	3.20	.78
Instructional TV	5.62	.46
Field trips	13.89	.03
Individualized instruction	3.28	.77
Computer assisted instruction	3.97	.78
Independent study	10.70	.09
Homework	4.31	.63
Library or research papers	10.32	.11
Laboratory/shop	5.69	.45
Practical examinations	7.41	.28
Peer teaching	10.36	.11
Written exams	11.48	.07

TABLE X

Programmed Instruction by Levels of Teaching

Category		group 0-3 yrs	4-13 yrs	14-35 yrs	Row Total
Not used	N	18	27	25	70
	R PCT	27.7	38.6	35.7	43.5
	C PCT	41.9	36.0	58.1	
	TOT PCT	11.2	16.8	15.5	
Seldom used	N	7	24	10	41
	R PCT	17.1	58.5	24.4	25.5
	C PCT	16.3	32.0	23.3	
	TOT PCT	4.3	14.9	6.2	
Moderately used	N	6	17	3	26
	R PCT	23.1	65.4	11.5	16.1
	C PCT	14.0	22.7	7.0	
	TOT PCT	3.7	10.6	1.9	
Frequently used	N	12	7	5	24
	R PCT	50.0	29.2	20.8	14.9
	C PCT	27.9	9.3	11.6	14.9
	TOT PCT	7.5	4.3	3.1	
COLUMN TOTAL		43	75	43	161
		26.7	46.6	26.7	

TABLE XI
Field trips by Levels of Experience

Category		group 0-3 yrs	4-13 yrs	14-35 yrs	Row Total
Not used	N	17	12	18	47
	R PCT	36.2	25.5	38.3	29.0
	C PCT	39.5	16.0	40.9	
	TOT PCT	10.5	7.4	11.1	
Seldom used	N	11	32	16	59
	R PCT	18.6	54.2	27.1	36.4
	C PCT	25.6	42.7	36.4	
	TOT PCT	6.8	19.8	9.9	
Moderately used	N	11	26	8	45
	R PCT	24.4	57.8	17.8	27.8
	C PCT	25.6	34.7	18.2	
	TOT PCT	6.8	16.0	4.9	
Frequently used	N	4	5	2	11
	R PCT	36.5	45.5	18.2	6.8
	C PCT	9.3	6.7	4.5	
	TOT PCT	2.5	3.1	1.2	
COLUMN TOTAL		43	75	44	162
		26.5	46.3	27.2	100.0

COMPARISON OF METHODS USED BY YEARS OF VTI TEACHING EXPERIENCE

To see if there were any differences in methods of teaching used by the number of years of teaching experience at the Vocational Technical Institute level, the respondents were divided into three groups at the upper and lower quartiles. The first group had zero to two years, the second group three through eight years and the third group nine through 31 years of experience at the Vocational Technical Institutes.

There were significant differences on only two of the twenty-one items, the use of drill sessions and student led discussion. Drill sessions are used more frequently by teachers with less experience than more experience. Seventy-nine percent of the teachers with 0 to 2 years used this technique as compared to 58% of the middle group and 48% of the most experienced respondents. The complete distribution is found in Table XIII.

There were significant differences in how teachers used student led discussions. Sixty-nine percent of the teachers having 0 to 2 and 3 to 8 years of experience at the VTIs utilized student led discussions moderately or frequently while teachers with nine to thirty-one years of experience utilized this 49%. Fifty-one percent of this group did not or seldom used this method as compared to 31% of the beginning teachers and 61% of the mid experienced teachers. See Table XIV.

TABLE XII

Chi Square Analysis of Teaching Techniques
By Level of Teaching Experience
At the Vocational Technical Institutes

Method	Chi Square	Significance
Lecture	4.16	.65
Discussion, student led	16.86	.009
Discussion, teacher led	12.01	.06
Panel presentation	9.10	.16
Drill sessions	14.61	.02
Review sessions	1.77	.93
Slides, filmstrips, films	9.11	.16
Programmed instruction	7.72	.25
Recitation	8.91	.17
Demonstration	5.54	.47
Instructional TV/videotape	4.54	.60
Field trips	11.22	.08
Individualized instruction	2.01	.91
Computer assisted instruction	7.58	.27
Independent study	6.22	.39
Homework	8.78	.18
Library or research papers	6.57	.37
Laboratory/shop	1.23	.97
Practical exams	4.46	.61
Peer teaching	8.68	.19
Written exams	2.40	.87

TABLE XIII
Drill Sessions by Levels of Teaching at VTI

Category		Group 0-2 yrs.	3-8 yrs.	9-31 yrs.	Row Total
Not used	N	9	26	25	60
	R PCT	15.03	43.31	41.7	39.2
	C PCT	20.5	42.6	52.1	
	TOT PCT	5.9	17.0	16.3	
Seldom used	N	16	11	6	33
	R PCT	48.5	33.3	13.2	21.6
	C PCT	38.4	18.0	12.5	
	TOT PCT	10.5	7.2	3.9	
Moderately used	N	13	13	12	38
	R PCT	34.2	34.2	31.6	
	C PCT	29.5	21.3	25.0	
	TOT PCT	8.5	8.5	7.8	
Frequently used	N	6	11	5	22
	R PCT	27.3	50.0	22.7	
	C PCT	13.6	18.0	10.4	
	TOT PCT	3.9	7.2	3.3	
COLUMN TOTAL		44	61	48	153
		28.8	39.9	31.4	100.0

TABLE XIV
Student Led Discussion by Levels of Teaching at VTIs

Category		Group 0-2 yrs.	3-8 yrs.	9-31 yrs.	Row Total
Not used	N	4	7	12	23
	R PCT	17.4	30.4	52.2	14.6
	C PCT	9.5	11.3	22.2	
	TOT PCT	2.5	4.4	7.6	
Seldom used	N	9	31	16	56
	R PCT	16.1	55.4	28.6	35.4
	C PCT	21.4	50.0	29.6	
	TOT PCT	5.7	19.6	10.1	
Moderately used	N	22	17	23	62
	R PCT	35.5	27.4	37.1	
	C PCT	52.4	27.4	42.6	
	TOT PCT	13.9	10.8	14.6	
Frequently used	N	7	7	3	17
	R PCT	41.2	41.2	17.6	
	C PCT	16.7	11.3	5.6	
	TOT PCT	4.4	4.4	1.9	
COLUMN TOTAL		42	62	54	158
		26.6	39.2	34.2	100.0

COMPARISON OF TEACHING TECHNIQUES BY PROGRAM CLASSIFICATION

The respondents were grouped into eleven general categories to compare their teaching styles by program. The breakdown by type of program of the sample is presented in Table XV. The responses of the eleven groups to the list of 21 techniques is presented in Table XVI. There were significant differences on eleven of the twenty-one items, five past the .001 level.

There were differences in how slides, filmstrips, and films were used by the groups ($p < .001$). Health, food, building trades, environmental, automotive made frequent use of audio visuals while secretarial, business, industrial and support areas did not.

There were differences ($p < .001$) by programs in how field trips were utilized. Environmental business, marine, food services and building trades made more frequent use of field trips than did health services, secretarial, automotive and support services.

The use of library and/or research papers were used most frequently by the Health services, food services and building trades groups, moderately by the environmental, automotive, business and industrial groups and less frequently by the support services, secretarial and marine and electricity-electronic areas.

The use of laboratory/shop types of instruction varied at the .001 level among programs also. The instructors from the industrial, automotive, building trades, environmental, electricity-electronics program as well as food services and health services and marine programs made frequent use of this technique. The business, secretarial and some of the support areas did not.

TABLE XV

Classification of Faculty
By General Category

Category	N	%
Health Related	36	22.0
Food Services	7	4.3
Secretarial	7	4.3
Building Trades	12	7.3
Electricity/Electronics	12	7.3
Marine	11	6.7
Environmental	8	4.9
Automotive	8	4.9
Business	8	4.9
Industrial	7	4.3
Support Services	48	29.3

TABLE XVI

Comparison of Teaching Techniques
By Program Classification

Technique	Chisquare	Significance
Lecture	32.86	.32
Discussion, Student Led	49.67	.013
Discussion, Teacher Led	27.25	.61
Panel Presentation	37.97	.15
Drill Session	46.42	.02
Review Session	26.38	.65
Slides, filmstrips, films	75.92	.000
Programmed Instruction	30.27	.45
Recitation	52.23	.007
Demonstration	49.06	.015
Instructional TV/videotape	35.09	.23
Field Trips	90.62	.000
Individualized Instruction	46.17	.02
Computer Assisted Instruction	21.42	.87
Independent Study	52.49	.006
Homework	20.51	.90
Library/Research Papers	65.10	.000
Laboratory/Shop	63.82	.000
Practical Exams	30.38	.44
Peer Teaching	67.82	.000
Written Examinations	36.08	.20

The food services, building trades and industrial instructors utilized peer teaching frequently while the health services and support services made moderate use. The secretarial, automotive, and electricity-electronics program as well as business made little or no use of this method.

Two techniques were significantly different at the .01 level. These were recitation and independent study. The recitation method was more frequently used by the food services, industrial, support services and secretarial areas than any of the other areas.

Independent study was more frequently made use of by instructors in the environmental, industrial, marine and building trades areas than the others.

Four items were significant at the .05 level or beyond: Discussion, student led; Drill Sessions, Demonstration, and Individualized Instruction. Student Led Discussion was more frequently used in the food services, health services, building trades and industrial programs than the others. It was not or seldom used in the secretarial, electricity-electronics program, marine, automotive and environmental programs.

Drill Sessions were most frequently utilized by the industrial and secretarial groups, followed closely by the food services, building trades and support services groups. Over fifty percent of the food services, building trades, electricity and electronics, marine, environmental and business groups did not use this technique.

Demonstration was used frequently by instructors in all of the programs except business and the support areas. One hundred percent of the automotive group, 91% of the building trades and 75% of the environmental groups reported frequent use of demonstration.

Individualized instruction was most frequently used by instructors in the building trades, automotive and industrial programs. It was used less frequently by instructors in business, electricity-electronics.

Most Successful Teaching Techniques

The faculty members were asked to list the teaching techniques which they had most success in using and in which their students learned effectively. The responses were categorized and then tallied. The methods were then placed in rank order. The ranks of the ten most frequently used techniques are listed in Table XVII.The lecture method used alone and as the first step in an instructional sequence was the most widely reported effective instruction technique used. Second was applied and participatory learning techniques such as laboratory, shop or clinical experience. The second major way of presenting information and the third ranked technique was demonstration. The second major technique of providing practice and reinforcement application was the use of drill, practice and review sessions and the use of homework.

The evaluation dimension of teaching i.e. the use of examinations, written and/or practical ranked fifth. The third major technique to provide information to the students was by the use of different types of audio-visuals such as films, filmstrips and different types of transparencies.

Additional Teaching Techniques

Twenty-nine faculty members listed additional techniques that they used moderately or frequently. Thirty-eight entries were listed and these fell into 19 categories. The most frequently mentioned entry was the use of guest speakers. The use of different types of audio visual techniques such as diagrams, chalkboard, opague and overhead projectors was another major category. Different types of hands on or practical experience techniques such as clinical work experience, internship, on the job training and practicum were listed. Individualized methods such as tutorial, individually paced laboratory and oral examinations were also mentioned. Students were also actively involved in learning through use of simulation, role playing, group projects and self-evaluation.

TABLE XVII

RANK ORDER OF TEACHING TECHNIQUES REPORTED AS MOST SUCCESSFUL IN WHICH STUDENTS LEARNED EFFECTIVELY

1. Lecture/ lecture combined with discussion, demonstration, laboratory methods
2. Laboratory, Shop or Clinical methods
3. Demonstration
4. Drill, practice, review sessions, homework
5. Written exams, practical exams
6. Use of audio visuals, films, filmstrips, opague, overhead projector, etc.
7. Individualized instruction
8. Discussion, teacher led, student led
9. Peer teaching
10. Research problems, papers

TABLE XVIII

Additional Teaching Techniques Reported

Technique	Frequency	Percent
Case Studies	1	03
Chalk Board	1	03
Clinical Work Experience	1	03
Diagrams	1	03
Group Projects	2	05
Guest Speakers	6	16
Individually Paced Lab	1	03
Internship	1	03
On the Job Training	4	11
Opague Projector/Overhead/Radiographs	4	11
Oral Examinations	3	08
Peer Evaluation	1	03
Role Playing	2	05
Self Evaluation	1	03
Simulation	2	05
Standardized Tests	2	05
Student Questions	1	03
Tutorial	3	08
Practicum	1	03

SUCCESSFUL TEACHING PRACTICES

The second open ended question on the survey was: Please describe a specific illustration of one of your successful teaching experiences. Sixty-six faculty members listed one or more. The illustrations have been edited and a sample of the techniques included in Appendix C . No attempt was made to classify or analyze the practices listed.

INNOVATIVE TEACHING TECHNIQUES

The third open ended question on the survey was: Are you trying any new or innovative way of teaching a course or courses? Please describe the technique or approach you are using: Course Description of teaching technique:

Fifty-seven of the 167 respondents or 34% responded with a new or innovative way of teaching. The faculty members were asked if they wished to give their name and institution so that they could be cited in this report. The illustrations have been edited. A sample of the techniques is included in Appendix D . No attempt was made to classify or analyze the practices listed. More information can be gotten on the technique by contacting the VTI or instructor.

STUDENTS' VIEW OF TEACHING-LEARNING STYLES

THE SAMPLE

The sample consisted of 1400 students enrolled in the six vocational technical institutions during the Fall semester 1977. Thirty-five or of the forms were not usable or valid. The adjusted total was therefore 1365 students. The distribution by VTI is presented in Table XIX.

The largest group was from Southern Maine VTI at South Portland. Thirty-nine percent or 536 students responded. Twenty-one percent of the sample was from Northern Maine VTI at Presque Isle. One hundred sixty-five or 12.1% were from Central Maine VTI at Auburn while 157 or 11.1% were from Eastern Maine at Bangor. Next was Washington County VTI at Calais with 145 respondents. The remainder of the sample, 73 students or 5.3% came from Kennebec Valley VTI at Waterville.

The students represented 41 different programs or areas. They were asked to designate their program and classified into the appropriate category by using the list of programs from the catalog. The distribution of the sample by program is given in Table XX. The largest group was enrolled in the Building Construction curriculum. One hundred twenty-seven or 9.3% of the group were from this area. The second was Practical Nursing with 99 students or 7.3%; the third, Auto Technology with 95 or 7.0% and fourth, auto mechanics with 80 students or 5.9%. Seventy-four or 5.4% were enrolled in the Culinary Arts program. Next in rank were Law Enforcement students, 66 or 4.9% followed by Electronics Technology students, 57 or 4.2%. The Secretarial group was the last in order of groups having 50 or more.

TABLE XIX

Distribution of Students
By Vocational Technical Institute

VTI	N	Percent
Central Maine	165	12.1
Eastern Maine	157	11.1
Kennebec Valley	73	5.3
Northern Maine	287	21.0
Southern Maine	536	39.3
Washington County	145	10.6
Responses missing	2	.01

TABLE XX

Distribution of Respondents
By Program of Studies

Program	N	Percent
Autobody	25	1.8
Auto Mechanics	80	5.9
Auto Technology	95	7.0
Boat Building	28	2.1
Building Construction	127	9.3
Business Areas	25	1.8
Carpentry	34	2.5
Culinary	74	5.4
Diesel	14	1.0
Distributive/Marketing	38	2.8
Drafting	30	2.2
Electric Technology	37	2.7
Electricity	20	2.2
Electronic Communication	37	2.7
Electronic Technology	57	4.2
Environmental	7	0.5
Fire	5	0.4
Graphics	36	2.6
Health	18	1.3
Heating	15	1.1
Heavy Equipment	15	1.1

TABLE XX

Distribution of Respondents
By Program of Studies

Continued

Program	N	Percent
Hotel/Motel	9	0.7
Industrial Electric	16	1.2
Law Enforcement	66	4.8
Machine Tool	38	2.8
Marine Biology	22	1.6
Marine Technology	27	2.0
Masonry	12	0.9
Mechanics	13	1.0
Medical Lab	25	1.8
Plant Soil	12	0.9
Plumbing	23	1.7
Practical Nurse	99	7.3
Radiology	8	0.6
Residential Electrical	15	1.1
Secretarial	51	3.7
Secretarial Science	6	0.4
Sheet Metal	15	1.1
Waste Water	38	2.8
Welding	18	1.3
Missing	5	0.4
TOTAL	1365	100.0

The respondents were asked to give their grade point averages on a five point scale, 0 to 4. The mean was 2.94, median 2.99 and mode 3.00. One hundred twenty-seven or 9.3% of the sample chose not to respond or did not know their average. The twenty fifth percentile was 2.6 and the seventy-fifth percentile 3.2. Only 2.2% of the group reported having less than a 2.0 average. The ages of the sample rangedfrom 17 to 53. The mean age was 21.4; the median 19.7 and the mode 19.0. Only 25% of the group were 23 years old or older. Seventy-five percent of the group were in the 17-22 year bracket, or students who were just out of high school or very recent graduates.

Approximately three-fourths of the respondents were male (1010) and 24% female (322). Only thirty-three did not check this item.

The students were also asked how many semesters they completed. The mean was 1.72 semesters, mode 1.00 and median 1.412. Half of the group responding were in their first year at the VTI. About twelve percent or 157 students did not respond to this item.

Two hundred and thirty or 16.8% of the group reported they were married. One thousand forty-four or 76.5 were single. Ninety-one students chose not to answer this item.

About seventy percent reported that they have had some full time work experience while 24% did not have any. Seven percent of the group did not answer the question. Seventy-one or 5.6 percent were currently working full time while 612 or 44.8 percent were working part time and 588 or 43.1 [illegible] not working at the present.

THE INSTRUMENT

The instrument completed by the students had three parts: the first, consisted of eight demographic items; the second, consisted of 39 teaching and learning techniques for which the students were asked to rate on a five point scale how helpful they thought these techniques were and two open ended questions asking students about what learning techniques and styles were best for them; the third, consisted of six different instruments measuring types of personality and learning style variables. The instruments used were Rotter's Locus of Control Scale, Gordon's Work Environment Preference Schedule, Crites' Attitude Scale from the Career Maturity Inventory, Drummond's Cognitive Style Preference Scale and Costin's Attitude Toward Evaluation Scale.

The Ways of Learning Inventory, Part Two of the study, was factor analyzed to identify the structure of the instrument. Seven factors were extracted and accounted for 53.7% of the variance. The rotated factor structure is summarized in Table XXI.

TABLE XXI

Factor Structure of Ways of Learning Inventory

Factor Number	Items	Loading	Percent of Variance
1	"Study-Repetition-Reinforcement"		15.5
	Taking notes on what I have read	.84	
	Doing workbook	.61	
	Doing homework	.55	
	Writing answers to questions in text	.34	
2	"Audio Visual"		6.3
	Watching a movie	.63	
	Viewing a filmstrip	.58	
	Watching/listening to slide/lecture	.52	
	Listening to record or tape of lesson	.49	
	Discussing videotape		
3	"Group-Peer Learning"		5.8
	Discussing topics with friends	.58	
	Answering questions of peers	.56	
	Receiving instruction from peers	.52	
	Small group discussion	.45	
	Working with group on experiment	.34	
4	"Computer Assisted Learning"		4.4
	Simulation/gaming on computer	.76	
	Computer for instruction	.68	
5	"Field Experience-Modeling"		3.7
	Visiting a worksite	.42	
	Watching a craftsman at work	.64	
	Working with a craftsman	.71	
6	"Investigative-Research Skills"		3.4
	Giving a report	.51	
	Using the library or reference room	.35	
	Writing a research paper	.68	

TABLE XXI

Factor Structure of Ways of Learning Inventory

Continued

Factor Number	Items	Loading	Percent of Variance
7	"Participation/Work Experience"		3.3
	Watching an experiment	.49	
	Performing an experiment or shop exercise	.60	
	Having actual work experience	.36	
8	"Instructor Centered Learning"		3.0
	Listening to teacher talk	.47	
	Asking teacher questions	.57	
	Individualized instruction with teacher	.40	
	Listening to guest lecturers	.31	
9	"Positive Reinforcement"		2.9
	Good grades	.35	
	Working with programmed instruction	.30	
10	"Types of Tests"		2.8
	Written tests	.40	
	Practical tests	.50	
11	"Information Seeking"		2.6
	Answering questions of others	.36	
	Being tutored	-.33	

ATTITUDE TOWARD INSTRUCTIONAL TECHNIQUES

The students were asked to react to a 39 item Ways of Learning Inventory on a five point scale ranging from (1) hinders learning to (5) extremely helpful in learning. The reaction of the total sample to the items is presented in Table XXII.

The most helpful technique to the students was "work experience." Eighty-four percent of the students agreed that this method was extremely helpful. The second in order of helpfulness was "working with a craftsman." Two-thirds of the group reported that this was extremely helpful. Third in order was "participating in a demonstration." Watching a demonstration was fourth. Asking teachers questions and listening to lectures were next in rank. Fifty-two percent of the students felt that individualized instruction was extremely helpful. Demonstrations by craftsmen were considered valuable by 51.4% of the sample. Working on an experiment or shop exercise was next in order of helpfulness.

The least helpful technique by the students was giving reports. It should be noted that several of the techniques listed in the survey are not readily available to students such as gaming and simulation exercises on the computer, computer assisted instruction or performing on video tape. These activities were viewed more in the neutral or undecided category. The students disliked doing research papers though not as strongly as giving reports. The students tended to prefer face to face contact with the instructor and rated listening to a lesson on a tape or record as not as helpful.

It should be noted that overall the students tended to be rather positive toward the different teaching/learning techniques listed.

TABLE XXII

Responses of Students to How Helpful
They Viewed Different Instructional Techniques

Technique		NR	H	NH	U	SH	EH	Mean
Written exams	N	9	45	103	107	823	278	3.87
	%	0.7	3.3	7.5	7.8	60.3	20.4	
Filmstrips	N	9	10	147	183	808	213	3.78
	%	0.7	0.7	10.8	13.4	58.8	15.6	
Lecture	N	7	11	37	102	620	588	4.27
	%	0.5	0.8	2.7	7.5	45.4	43.1	
Demonstration/watching	N	13	9	23	65	378	877	4.54
	%	1.0	0.7	1.7	4.8	27.7	64.2	
Listening to tape	N	17	49	407	357	446	89	3.08
	%	1.2	3.6	29.8	26.2	32.7	6.5	
Homework	N	18	34	104	154	702	353	3.91
	%	1.3	2.5	7.6	11.3	51.4	25.9	
Textbook	N	14	24	79	122	735	391	4.02
	%	1.0	1.8	5.8	8.9	53.8	28.6	
TV/Video tape	N	20	23	143	343	607	229	3.65
	%	1.5	1.7	10.5	25.1	44.5	16.8	
Movies	N	19	16	104	175	682	369	3.95
	%	1.4	1.2	7.6	12.8	50.0	27.0	
Asking teacher questions	N	17	11	29	78	425	805	4.47
	%	1.2	0.8	2.1	5.7	31.1	59.0	
Workbook	N	19	21	144	222	683	276	3.77
	%	1.4	1.5	10.5	16.3	50.0	20.2	
Discussion	N	19	21	61	130	599	535	4.16
	%	1.4	1.5	4.5	9.5	43.9	39.2	

TABLE XXII

Responses of Students to How Helpful
They Viewed Different Instructional Techniques

Technique		NR	H	NH	U	SH	EH	Mean
Demonstration/participation	N	30	11	18	78	344	884	4.55
	%	2.2	0.8	1.3	5.7	25.2	64.8	
Work experience	N	20	7	14	27	145	1152	4.80
	%	1.5	0.5	1.0	2.0	10.6	84.4	
Answering text questions	N	14	28	183	277	626	237	3.63
	%	1.0	2.1	13.4	20.3	45.9	17.4	
Discussing TV/videotape	N	23	41	209	348	580	164	3.46
	%	1.7	3.0	15.3	25.5	42.5	12.0	
Answering Questions of others	N	17	34	147	294	583	290	3.70
	%	1.2	2.5	10.8	21.5	42.7	21.2	
Taking Notes on Reading	N	16	46	148	189	585	381	3.82
	%	1.2	3.4	10.8	13.8	42.9	27.1	
Individualized Instruction	N	11	15	40	185	400	714	4.29
	%	0.8	1.1	2.9	13.6	29.3	52.3	
Giving Reports	N	15	218	408	358	285	81	2.70
	%	1.1	16.0	29.9	26.2	20.9	5.9	
Project	N	12	33	93	181	569	477	4.00
	%	0.9	2.4	6.8	13.3	41.7	34.9	
Library	N	13	36	115	250	656	295	3.78
	%	1.0	2.6	8.4	18.3	48.1	21.6	
Programmed instruction	N	15	48	158	427	546	171	3.47
	%	1.1	3.5	11.6	31.3	40.0	12.5	
Answering teacher questions	N	14	10	105	229	747	260	3.84
	%	1.0	0.7	7.7	16.8	54.7	19.0	

TABLE XXII

Responses of Students to How Helpful
They Viewed Different Instructional Techniques

Technique		NR	H	NH	U	SH	EH	Mean
Working on exper. or in shop	N	16	29	64	99	510	647	4.24
	%	1.2	2.1	4.7	7.3	37.4	47.4	
Receiving good grades	N	16	23	85	170	366	705	4.21
	%	1.2	1.7	6.2	12.5	26.8	51.6	
Visiting a work site	N	14	16	41	137	490	667	4.29
	%	1.0	1.2	3.0	10.0	35.9	48.9	
Taking a practical test	N	10	32	117	237	613	356	3.84
	%	0.7	2.3	8.6	17.4	44.9	26.1	
Computer or gaming exercises	N	25	105	199	637	245	154	3.10
	%	1.8	7.7	14.6	46.7	17.9	11.3	
Performing on video tape	N	24	140	232	564	264	141	3.02
	%	1.8	10.3	17.0	41.3	19.3	10.3	
Guest lecturers	N	14	44	153	227	663	264	3.70
	%	1.0	3.2	11.2	16.6	48.6	19.3	
Slide & lecture presentation	N	17	43	208	248	668	181	3.54
	%	1.2	3.2	15.2	18.2	48.9	13.3	
Computer for instruction	N	33	91	202	681	251	107	3.06
	%	2.4	6.7	14.8	49.9	18.4	7.8	
Peer instruction	N	24	90	184	266	627	174	3.45
	%	1.8	6.6	13.5	19.5	45.9	12.7	
Tutoring in deficient areas	N	20	28	85	294	411	527	3.98
	%	1.5	2.1	6.2	21.5	30.1	38.6	
Small group discussion	N	23	36	129	250	607	320	3.77
	%	1.7	2.6	9.5	18.3	44.5	23.4	
Research paper	N	20	114	262	265	501	212	3.32
	%	1.5	8.4	19.2	18.8	36.7	15.5	
Demonstration by craftsman	N	16	13	35	118	482	701	4.35
	%	1.2	1.0	2.6	8.6	35.3	51.4	
Working with craftsman	N	17	12	15	101	310	910	4.55
	%	1.2	0.9	1.1	7.4	22.7	66.7	

TABLE XXIII

Rank Order of Teaching/Learning Techniques
By VTI Students

RANK	ITEM	MEAN	RANK	ITEM	MEAN
1	Work experience	4.80	21	Taking notes on reading	3.82
2	Working with craftsman	4.55	22	Library	3.78
3	Demonstration/participation	4.55	23	Filmstrips	3.78
4	Demonstration/watching	4.54	24	Small group discussion	3.77
5	Asking teacher questions	4.47	25	Workbook	3.77
6	Demonstration by craftsman	4.35	26	Answering peer questions	3.70
7	Individualized instruction	4.29	27	Guest lecturers	3.70
8	Visiting a work site	4.29	28	TV/video tape	3.65
9	Lecture	4.27	29	Answering text questions	3.63
10	Experiment/shop work	4.24	30	Slide/lecture	3.54
11	Receiving good grades	4.21	31	Programmed instruction	3.47
12	Discussion	4.16	32	Discussing TV/video tape	3.46
13	Textbook	4.02	33	Peer instruction	3.45
14	Project	4.00	34	Research paper	3.32
15	Tutoring	3.98	35	Gaming/simulation	3.10
16	Movies	3.95	36	Listening to tape	3.08
17	Homework	3.91	37	Computer for instruction	3.06
18	Written exams	3.87	38	Performing on video tape	3.02
19	Practical exams	3.84	39	Giving reports	2.70
20	Answering teacher questions	3.84			

SEX DIFFERENCES

There were sex differences on 26 of the 39 items. Women tended to be more positive to the teaching/learning techniques than men. They rated 24 of 26 items significantly more positively than the males. Males only rated "working on a project by myself" and "performing an experiement or shop exercise" more helpful than did the women. The results of the comparisons by sex are presented in Table XXIV.

Women tended to have higher ratings than men on the study-repetition-reinforcement factor, investigative research skills, instructor centered learning, positive reinforcement, types of tests, and information seeking factor. There were no significant differences between the two groups on the field experience-modeling items, computer assisted learning and audio visual factors. Males tended to have higher ratings than women on participation/work experience type of items.

TABLE XXIV

Evaluation of VTI Students
To Teaching Learning Techniques
By Sex

Technique	Male (1005)	Female (318)	t
Written test	3.81	4.09	4.60
Viewing filmstrip	3.78	3.78	0.00
Listening to teacher talk	4.24	4.42	3.49
Watching exper./shop demonstration	4.57	4.45	2.43
Listening to record, tape	3.05	3.01	1.92
Doing homework	3.82	4.25	7.26
Reading textbook	4.00	4.10	1.84
Watching videotape	3.57	3.84	4.47
Watching movie	3.90	4.11	3.52
Asking teacher questions	4.45	4.54	1.79
Exercise in workbook	3.68	4.08	6.58
Discussing topic with class members	4.15	4.26	2.01
Perform experiment./shop exercise	4.59	4.41	3.93
Work experience	4.77	4.89	3.25
Writing answers to text questions	3.56	3.89	5.37
Discussing videotape	3.38	3.70	5.04
Answering others questions	3.68	3.81	1.99
Taking notes on reading	3.72	4.15	6.43
Individualized instruction	4.28	4.34	1.01
Giving report to class	2.68	2.86	2.50

TABLE XXIV

Evaluation of VTI Students
To Teaching Learning Techniques
By Sex

Continued

Technique	Male (1005)	Female (318)	t
Working on project alone	4.07	3.78	4.60
Using the library	3.70	4.07	6.07
Programmed instruction	3.38	3.72	5.34
Answering teachers questions	3.83	3.90	1.29
Work on exper./shop exercise	4.21	4.33	1.96
Receiving good grades	4.13	4.48	5.47
Visiting a work site	4.24	4.42	3.25
Taking practical test	3.82	3.94	1.96
Gaming or simulation	3.08	3.17	1.34
Watching own videotape performance	3.00	3.14	2.10
Guest lecturers	3.66	3.85	3.01
Slide/lecture presentation	3.52	3.64	1.92
Computer for instructional purposes	3.04	3.13	1.40
Peer tutoring	3.50	3.42	1.19
Being tutored	3.91	4.26	5.37
Small group discussion	3.70	4.04	5.35
Writing a research paper	3.21	3.69	6.33
Watching craftsman demonstrate	4.37	4.28	1.83
Working with skilled craftsman	4.56	4.55	0.00

___ significant at or beyond the .05 level

AGE DIFFERENCES

The sample was subdivided into two groups, students who were between 17 and 21 and those 22 years or older. The first group represents students who for the most part attended the VTI shortly after graduation from high school. The second group represents students who have had other types of experiences prior to returning to the VTI for further education. There were 519 in the first age bracket and 208 in the second.

There were significant differences in the means of younger and older students on eleven of the items. The 18 to 21 group had higher mean scores on receiving good grades, viewing a filmstrip and listening to the teacher talk, while the second group had higher mean scores on the study-repetition-reinforcement items of doing homework, reading the textbook, doing an exercise in the workbook, taking notes on reading, and answering teacher questions. They also rated discussing a video tape or an instructional TV tape and individualized instruction more helpful than the 18 to 21 year old group.

There were no significant differences by age on the discussion group-peer learning dimension, computer assisted learning, field experience-modeling and participating-work experience dimensions. The means of the two groups and results of the t test are listed in Table XXV.

TABLE XXV

Evaluation of VTI Students
To Teaching/Learning Techniques
By Age

Technique	17-21 (519)	22 & up (208)	df (725) t
Written test	3.18	3.30	1.13
Viewing filmstrip	2.69	2.43	3.82
Listening to teacher talk	2.54	2.35	1.96
Watching exper./shop demonstration	3.28	3.24	0.56
Listening to record, tape	3.07	3.08	0.13
Doing homework	3.76	3.97	2.13
Reading textbook	3.91	4.11	2.33
Watching videotape	3.58	3.70	1.29
Watching movie	3.93	4.03	1.15
Asking teacher questions	4.43	4.52	1.12
Exercise in workbook	3.69	3.88	1.99
Discussing topic with class members	4.12	4.15	0.37
Perform experiment/shop exercise	4.44	4.48	0.46
Work experience	4.77	4.82	0.90
Writing answers to text questions	3.57	3.71	1.48
Discussing videotape	3.39	3.58	2.04
Answering others questions	3.62	3.81	1.89
Taking notes on reading	3.67	3.91	2.26
Individualized instruction	4.19	4.42	2.79
Giving report to class	2.57	3.00	3.93

TABLE XXV

Evaluation of VTI Students
To Teaching/Learning Techniques
By Age

Continued

Technique	17-21 (519)	22 & up (208)	df (725) t
Working on project alone	3.91	4.10	1.95
Using the library	3.74	3.81	0.81
Programmed instruction	3.47	3.49	0.21
Answering teachers questions	3.74	3.94	2.38
Work on exper./shop exercise	4.20	4.16	0.38
Receiving good grades	4.25	4.02	2.27
Visiting a work site	4.23	4.37	1.69
Taking practical test	3.67	3.89	2.25
Gaming or simulation	3.09	3.10	0.12
Watching own videotape performance	3.00	3.10	0.97
Guest lecturers	3.74	3.74	0.05
Slide/lecture presentation	3.49	3.54	0.57
Computer for instructional purposes	3.00	3.12	1.32
Peer tutoring	3.45	3.46	0.16
Being tutored	3.92	4.06	1.51
Small group discussion	3.75	3.72	0.30
Writing a research paper	3.25	3.30	0.48
Watching craftsman demonstrate	4.30	4.28	0.19
Working with skilled craftsman	4.48	4.50	0.25

_____ significant at or beyond the .05 level

MARITAL STATUS

There were 228 married and 1039 unmarried students. There were significant differences between the means on 13 of the 39 items. Married students rated 10 of these 13 items higher than the unmarried group. Those not married rated two items in the group discussion-peer dimension higher than the married group. The two items were discussing a topic with some members of my class and receiving instruction from other students. The married students had significantly higher means on the audio visual item relating to the use of filmstrips, tapes, records, and movies and on the study-repetition-reinforcement items such as reading my textbook, taking notes on reading, and doing an exercise in a workbook. They preferred to be tutored by an instructor in an area of their deficiency rather than peers. They also rated taking practical tests higher than the unmarried group.

There were no significant differences between the two groups on the field-experience-modeling and participation and work experience dimensions. The means for each group and t comparisons are found in Table XXVI.

TABLE XXVI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Marital Status

Technique	Married (228)	Not Married (1039)	t
Written test	3.99	3.86	1.95
Viewing filmstrip	3.89	3.76	2.01
Listening to teacher talk	4.31	4.27	0.67
Watching exper./shop demonstration	4.51	4.54	0.53
Listening to record, tape	3.24	3.05	2.53
Doing homework	3.98	3.90	1.04
Reading textbook	4.19	3.99	3.03
Watching videotape	3.73	3.62	1.58
Watching movie	4.09	3.94	2.34
Asking teacher questions	4.50	4.46	0.74
Exercise in workbook	4.00	3.73	4.02
Discussing topic with class members	4.05	4.20	2.31
Perform experiment/shop exercise	4.56	4.55	0.16
Work experience	4.75	4.81	1.44
Writing answers to text questions	3.71	3.62	1.20
Discussing videotape	3.55	3.44	1.60
Answering others questions	3.80	3.68	1.64
Taking notes on reading	3.96	3.79	2.27
Individualized instruction	4.42	4.26	2.42
Giving report to class	2.96	2.66	3.56

TABLE XXVI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Marital Status

Continued

Technique	Married (228)	Not Married (1039)	t
Working on project alone	4.07	3.99	1.07
Using the library	3.89	3.76	1.91
Programmed instruction	3.56	3.44	1.63
Answering teachers questions	3.98	3.81	2.65
Work on exper./shop exercise	4.20	4.25	0.75
Receiving good grades	4.30	4.21	1.21
Visiting a work site	4.36	4.27	1.41
Taking practical test	4.01	3.81	2.82
Gaming or simulation	3.09	3.12	0.41
Watching own videotape performance	3.11	3.02	1.10
Guest lecturers	3.68	3.71	0.36
Slide/lecture presentation	3.64	3.52	1.54
Computer for instructional purposes	3.15	3.07	1.12
Peer tutoring	3.31	3.50	2.49
Being tutored	4.16	3.94	2.86
Small group discussion	3.73	3.79	0.84
Writing a research paper	3.46	3.29	1.90
Watching craftsman demonstrate	4.37	4.34	0.55
Working with skilled craftsman	4.52	4.55	0.58

____ significant at or beyond the .05 level

WORK STATUS

The items were compared by whether the students were working part time, full time or not at present. There were significant differences on two of the items. In general, work status did not affect the ratings. Students who were working full time tended to be more positive about certain types of learning activities. They were more positive about giving reports, and answering teachers questions than students who were not working or working only part time.

Possibly if the students were working in a field related to their major, they were more knowledgeable about the area and had more self-confidence about the subject.

The means by work status and results of the one way analysis of variance are presented in Table XXVII.

TABLE XXVII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Work Status

Technique	Work Full Time (71)	Work Part Time (611)	Not Working (583)	F 2/1260
Written test	3.71	3.90	3.88	1.25
Viewing filmstrip	3.81	3.78	3.80	0.12
Listening to teacher talk	4.24	4.26	4.32	1.03
Watching exper./shop demonstration	4.49	4.57	4.50	1.22
Listening to record, tape	3.21	3.11	3.05	1.10
Doing homework	3.90	3.87	3.98	2.08
Reading textbook	4.12	4.01	4.06	0.87
Watching videotape	3.59	3.63	3.65	0.17
Watching movie	4.12	3.96	3.97	1.13
Asking teacher questions	4.53	4.46	4.48	0.38
Exercise in workbook	3.75	3.77	3.78	0.05
Discussing topic with class members	4.00	4.16	4.21	2.07
Perform exper./shop exercise	4.61	4.58	4.52	1.26
Work experience	4.76	4.78	4.82	1.07
Writing answers to text questions	3.77	3.66	3.61	1.06
Discussing videotape	3.31	3.47	3.47	0.95
Answering others questions	3.85	3.67	3.73	1.21
Taking notes on reading	3.95	3.75	3.88	2.71
Individualized instruction	4.10	4.28	4.32	2.11
Giving report to class	2.95	2.63	2.79	4.32

TABLE XXVII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Work Status

Continued

Technique	Work Full Time (71)	Work Part Time (611)	Not Working (583)	F 2/1260
Working on project alone	3.97	4.03	4.00	0.18
Using the library	3.87	3.76	3.81	0.64
Programmed instruction	3.44	3.44	3.48	0.36
Answering teachers questions	4.10	3.80	3.87	4.40
Work on exper./shop exercise	4.12	4.25	4.25	0.65
Receiving good grades	4.21	4.23	4.20	0.14
Visiting a work site	4.40	4.29	4.28	0.53
Taking practical test	3.80	3.84	3.86	0.20
Gaming of simulation	3.12	3.08	3.16	0.83
Watching own videotape performance	3.04	3.00	3.08	0.92
Guest lecturers	3.77	3.72	3.69	0.31
Slide/lecture presentation	3.67	3.55	3.53	0.59
Computer for instructional purposes	3.04	3.05	3.12	0.88
Peer tutoring	3.46	3.43	3.51	0.72
Being tutored	3.95	3.98	4.00	0.10
Small group discussion	3.67	3.76	3.84	1.53
Writing a research paper	3.40	3.28	3.36	0.79
Watching craftsman demonstrate	4.43	4.36	4.33	0.63
Working with skilled craftsman	4.64	4.51	4.58	2.00

DIFFERENCES BY VOCATIONAL TECHNICAL INSTITUTE

The mean ratings of the six vocation technical institutes were compared using analysis of variance. There were significant differences between the means on 25 of the 39 items. The programs vary throughout the system although there are some programs common across some of the institutes which partly may account for some of the differences. Also, since the group of respondents are so large, some of the differences may be statistically significant, but not indicate any real practical differences.

It is of interest nevertheless, to identify some of the items in which there were no differences between institutes. The means and analysis of variance results are listed in Table 28. P-imarily there were no significant differences in how the work experience, field experience modeling dimensions were viewed across VTIs. There were also no differences on the Computer related or video-tape related dimensions since the hardware is not readily available at the institutes. Study skill-repetition-reinforcement items such as writing answers to questions in class, taking notes on what I read, taking a practical test, answering teacher's questions did not differ significantly across schools. Giving a report to class was rated low by all.

TABLE XXVIII

Evaluation of VTI Students
To Teaching Learning Techniques
By School Attended

Technique	Au (165)	Ba (154)	Ca (144)	PI (285)	SP (534)	Wa (72)	F S/1348
Written test	3.95	3.90	3.87	3.77	3.87	4.01	1.17
Viewing filmstrip	3.93	3.50	3.76	3.80	3.80	3.79	4.43
Listening to teacher talk	4.42	4.25	4.37	4.20	4.23	4.39	2.86
Watching exper./shop demonstration	4.66	4.41	4.64	4.47	4.57	4.42	3.52
Listening to record, tape	3.35	2.98	3.16	3.17	3.00	2.87	4.61
Doing homework	3.90	4.23	3.63	3.83	3.92	4.06	7.02
Reading textbook	4.07	3.91	4.06	3.82	4.13	4.11	5.57
Watching videotape	3.89	3.46	3.56	3.75	3.61	3.49	4.85
Watching movie	4.07	3.63	3.88	4.07	3.96	4.01	5.76
Asking teacher questions	4.27	4.49	4.60	4.43	4.50	4.53	3.50
Exercise in workbook	3.58	3.76	3.71	3.89	3.76	3.98	3.12
Discussing topic with class members	4.26	4.37	4.17	4.09	4.11	4.11	2.88
Perform experiment/ shop exercise	4.78	4.46	4.65	4.43	4.57	4.39	6.69
Work experience	4.82	4.84	4.83	4.78	4.78	4.81	0.47
Writing answers to text questions	3.59	3.58	3.56	3.68	3.61	3.95	2.03
Discussing videotape	3.74	3.37	3.40	3.49	3.40	3.40	3.44
Answering others questions	3.75	3.86	3.80	3.80	3.59	3.47	3.91
Taking notes on reading	3.96	3.74	3.90	3.68	3.84	3.84	1.88
Individualized instruction	4.39	4.37	4.44	4.20	4.31	3.91	4.85
Giving report to class	2.75	2.64	2.72	2.71	2.68	2.76	0.20

TABLE XXVIII

Evaluation of VTI Students
To Teaching Learning Techniques
By School Attended

Continued

Technique	Au (165)	Ba (154)	Ca (144)	PI (285)	SP (534)	Wa (72)	F 5/1348
Working on project alone	4.25	3.89	4.27	3.96	3.91	4.04	5.62
Using the library	4.01	3.79	3.62	3.71	3.75	4.02	3.98
Programmed instruction	3.61	3.21	3.53	3.63	3.37	3.53	5.66
Answering teachers questions	3.83	3.85	3.98	3.79	3.82	3.91	1.18
Work on exper./shop exercise	4.41	4.26	4.29	4.17	4.22	4.27	1.57
Receiving good grades	4.40	4.10	3.84	4.31	4.27	4.05	6.82
Visiting a work site	4.33	4.15	4.12	4.41	4.31	4.27	3.25
Taking practical test	3.79	4.02	3.84	3.76	3.85	3.80	1.56
Gaming or simulation	2.92	3.19	3.15	3.16	3.10	3.02	1.50
Watching own videotape performance	3.04	3.15	2.95	3.04	2.98	3.06	0.68
Guest lecturers	3.70	3.57	3.68	3.68	3.79	3.38	2.92
Slide/lecture presentation	3.80	3.17	3.60	3.50	3.59	3.42	7.04
Computer for instructional purposes	2.95	3.20	2.90	3.07	3.07	3.17	2.02
Peer tutoring	3.50	3.71	3.53	3.44	3.37	3.27	3.01
Being tutored	4.00	4.13	3.81	3.93	4.03	3.85	2.04
Small group discussion	3.92	3.84	3.79	3.77	3.70	3.85	1.60
Writing a research paper	3.40	3.06	3.41	3.11	3.47	3.27	5.29
Watching craftsman demonstrate	4.54	4.30	4.25	4.34	4.36	4.19	2.91
Working with skilled craftsman	4.62	4.56	4.58	4.50	4.56	4.41	1.05

SEMESTER OF ATTENDANCE

The students were asked to check their semester of attendance at the VTI and the means and results of the analysis of variance are included in Only two of the 39 comparisons were significantly different than chance. These were "reading the textbook" and "doing a project by self". There was a slight tendency for students who have attended school longer to view textbooks as more helpful and similarly doing projects themselves.

TABLE XXIX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Semester of Attendance

Technique	1 (643)	2 (244)	3 (261)	4 (18)	5 (2)	6 (3)	F 5/1165
Written test	3.23	3.22	3.12	2.90	3.00	4.00	0.36
Viewing filmstrip	2.57	2.60	2.73	2.16	3.00	2.33	1.28
Listening to teacher talk	2.42	2.52	2.58	2.22	2.50	2.33	0.49
Watching exper./shop demonstration	3.27	3.18	3.31	2.94	3.00	3.33	0.54
Listening to record, tape	3.15	2.94	2.98	2.40	2.00	2.00	1.63
Doing homework	3.79	4.01	3.68	3.80	4.00	3.00	1.20
Reading textbook	3.84	4.27	3.92	4.25	4.00	3.00	3.62
Watching videotape	3.65	3.49	3.57	3.00	4.00	3.00	0.82
Watching movie	4.01	3.88	3.93	3.83	5.00	4.00	0.58
Asking teacher questions	4.49	4.45	4.41	4.83	5.00	5.00	0.62
Exercise in workbook	3.78	3.80	3.61	3.16	4.00	3.00	1.08
Discussing topic with class members	4.07	4.33	4.15	4.66	5.00	5.00	2.05
Perform experiment/shop exercise	4.36	4.52	4.59	4.83	5.00	5.00	1.66
Work experience	4.76	4.81	4.77	5.00	5.00	5.00	0.31
Writing answers to text questions	3.63	3.64	3.47	2.83	5.00	3.00	1.60
Discussing videotape	3.49	3.44	3.26	2.83	5.00	3.00	1.81
Answering others questions	3.65	3.77	3.67	3.66	4.00	5.00	0.54
Taking notes on reading	3.69	3.90	3.53	3.83	5.00	5.00	1.72
Individualized instruction	4.19	4.25	4.32	4.00	5.00	5.00	0.67
Giving report to class	2.67	2.68	2.61	3.00	2.00	3.00	0.24

TABLE XXIX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Semester of Attendance

Continued

Technique	1 (643)	2 (244)	3 (261)	4 (18)	5 (2)	6 (3)	F 5/1165
Working on project alone	3.86	3.90	4.20	4.33	2.00	3.00	2.93
Using the library	3.85	3.61	3.62	4.00	4.00	4.00	1.55
Programmed instruction	3.51	3.31	3.41	2.83	3.00	3.00	1.19
Answering teachers questions	3.71	3.95	3.81	3.83	5.00	4.00	1.64
Work on exper./shop exercise	4.17	4.25	4.17	4.16	5.00	5.00	0.36
Receiving good grades	4.20	4.28	4.06	3.50	4.00	4.00	0.99
Visiting a work site	4.33	4.04	4.32	4.66	5.00	5.00	2.21
Taking practical test	3.70	3.91	3.65	3.66	2.00	4.00	1.51
Gaming or simulation	3.05	3.25	3.06	3.16	2.00	3.00	0.74
Watching own videotape performance	2.95	3.04	3.05	2.66	4.00	3.00	0.41
Guest lecturers	3.73	3.65	3.77	4.00	4.00	4.00	0.27
Slide/lecture presentation	3.50	3.54	3.48	3.16	4.00	4.00	0.26
Computer for instructional purposes	3.02	3.17	2.90	3.00	4.00	3.00	1.06
Peer tutoring	3.40	3.64	3.47	4.33	4.00	4.00	1.62
Being tutored	3.98	4.07	3.77	3.66	4.00	5.00	1.37
Small group discussion	3.78	3.83	3.61	4.33	4.00	4.00	1.03
Writing a research paper	3.25	3.13	3.30	3.00	2.00	5.00	0.96
Watching craftsman demonstrate	4.29	4.27	4.32	4.33	4.00	5.00	0.17
Working with skilled craftsman	4.44	4.53	4.49	4.66	5.00	4.00	0.37

CMI ATTITUDE SCALE

The responses to the teaching learning activities were compared on three dimensions of the CMI Attitude Scale. These were the Intellectual Factor, the Decision factor and total score on the CMI. The first two scales were derived by a factor analysis of the scale (Drummond, in press). The results of the comparisons on the Intellectual Factor are reported in Table 30 , the Decision Factor in Table 31 , and the total scale in Table 32.

There were four significant differences between the means of the high, low and average groups on the Intellectual Factor. The higher or more positive their attitude the more helpful they felt about the usefulness of homework, performing a shop or laboratory exercise, or having actual work experience or listening to the teacher talk. Students having a better conception of the career choice process had more positive attitudes toward instructional techniques.

The breakdown on the Decision factor of the CMI Attitude Scale by level is presented in Table 31 . There were only two significant differences. Those high in the factor felt that working on a project by themselves was helpful in learning their assignments. Those who were low on the decision factor felt that discussing video tape or instructional television was more helpful than those who scored higher on the decision factor. Those who are sure of their decisions probably feel like doing something rather than just talking about an area.

TABLE XXX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Intellectual Factor of CMI Attitude Scale

Technique	Intellect Low (93)	Medium (171)	High (92)	F 2/355
Written test	3.71	3.82	3.93	1.24
Viewing filmstrip	3.71	3.78	3.91	1.36
Listening to teacher talk	4.28	4.21	4.50	4.06
Watching exper./shop demonstration	4.44	4.49	4.63	1.35
Listening to record, tape	3.05	2.93	3.10	0.83
Doing homework	3.68	3.85	4.10	3.61
Reading textbook	3.80	3.95	4.02	1.15
Watching videotape	3.60	3.57	3.68	0.35
Watching movie	3.87	3.89	4.01	0.55
Asking teacher questions	4.50	4.46	4.55	0.35
Exercise in workbook	3.81	3.78	3.93	0.81
Discussing topic with class members	4.23	4.05	4.22	1.61
Perform experiment/shop exercise	4.55	4.35	4.68	4.01
Work experience	4.79	4.73	4.94	3.19
Writing answers to text questions	3.51	3.62	3.79	1.85
Discussing videotape	3.41	3.44	3.58	0.78
Answering others questions	3.60	3.67	3.85	1.74
Taking notes on reading	3.89	3.07	4.05	1.89
Individualized instruction	4.25	4.25	4.32	0.19
Giving report to class	2.62	2.70	2.88	1.24
Working on project alone	3.91	3.88	4.19	2.82

TABLE XXX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Intellectual Factor of CMI Attitude Scale

CONTINUED

Technique	Intellect Low (93)	Medium (171)	High (92)	F 2/355
Using the library	3.75	3.73	3.89	0.74
Programmed instruction	3.55	3.31	3.51	1.96
Answering teachers questions	3.80	3.86	3.79	0.23
Work on exper./shop exercise	4.19	4.23	4.42	1.52
Receiving good grades	4.28	4.29	4.12	1.02
Visiting a work site	4.24	4.32	4.31	0.25
Taking practical test	3.74	3.77	4.03	2.49
Gaming or simulation	3.12	3.02	3.33	2.42
Watching own videotape performance	3.01	2.93	3.26	2.39
Guest lecturers	3.71	3.62	3.75	0.49
Slide/lecture presentation	3.59	3.33	3.53	1.89
Computer for instructional purposes	3.16	2.93	3.10	1.79
Peer tutoring	3.39	3.33	3.45	0.33
Being tutored	3.96	3.95	4.14	1.06
Small group discussion	3.74	3.81	3.84	0.22
Writing a research paper	3.23	3.31	3.38	0.30
Watching craftsman demonstrate	4.33	4.35	4.45	0.55
Working with skilled craftsman	4.47	4.55	4.66	1.59

TABLE XXXI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Decision Factor Scale of CMI Attitude Scale

Technique	Decision			
	Low (43)	Medium (253)	High (60)	F 2/355
Written Test	3.74	3.81	3.93	0.55
Viewing filmstrip	3.79	3.83	3.63	1.40
Listening to teacher talk	4.39	4.30	4.26	0.36
Watching exper./shop demonstration	4.32	4.54	4.53	1.36
Listening to record, tape	3.09	3.03	2.85	0.74
Doing homework	3.81	3.87	3.95	0.19
Reading textbook	3.72	3.92	4.11	1.96
Watching videotape	3.51	3.65	3.48	0.90
Watching movie	3.95	3.86	4.11	1.59
Asking teacher questions	4.48	4.47	4.61	0.77
Exercise in workbook	3.86	3.79	3.95	0.67
Discussing topic with class members	4.20	4.16	4.03	0.61
Perform experiment/shop exercise	4.30	4.53	4.45	1.23
Work experience	4.67	4.82	4.83	1.02
Writing answers to text questions	3.32	3.67	3.70	2.43
Discussing videotape	3.60	3.53	3.15	3.88
Answering others questions	3.62	3.67	3.50	1.99
Taking notes on reading	3.88	3.86	3.95	0.15
Individualized instruction	4.44	4.25	4.23	0.75
Giving report to class	2.44	2.81	2.56	2.67

TABLE XXXI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Decision Factor Scale of CMI Attitude Scale

Continued

Technique	Decision Low (43)	Medium (253)	High (60)	F 2/355
Working on project alone	3.55	4.02	4.05	3.81
Using the library	3.90	3.76	3.75	0.37
Programmed instruction	3.41	3.41	3.50	0.15
Answering teachers questions	3.88	3.83	3.76	0.26
Work on exper./shop exercise	4.30	4.25	4.31	0.11
Receiving good grades	4.41	4.19	4.33	1.16
Visiting a work site	4.41	4.26	4.40	0.96
Taking practical test	3.81	3.85	3.73	0.37
Gaming or simulation	3.00	3.19	2.98	1.19
Watching own videotape performance	2.95	3.08	2.90	0.69
Guest lecturers	3.65	3.70	3.56	0.42
Slide/lecture presentation	3.37	3.47	3.41	0.21
Computer for instructional purposes	2.93	3.04	3.08	0.31
Peer tutoring	3.48	3.40	3.21	0.79
Being tutored	4.23	3.94	4.11	1.87
Small group discussion	3.69	3.82	3.80	0.23
Writing a research paper	3.07	3.31	3.46	1.26
Watching craftsman demonstrate	4.32	4.38	4.36	0.09
Working with skilled craftsman	4.53	4.54	4.61	0.23

____ significant at or beyond the .05 level

The means and standard deviations on the items by high, average and low groups on the total CMI score are listed in Table 32 . There are four items with significantly different mean ratings. Students who have more positive career choice attitudes feel that doing homework, reading textbooks, performing an experiment or exercise in shop and having work experience are helpful learning techniques and rate them higher than students who have less positive career choice attitudes.

ATTITUDE TOWARD EVALUATION

The responses to the thirty-nine teaching learning activities were also compared by the students' attitude toward evaluation. There were significant differences on seven of the items. The means and the F Values from the analysis of variance are presented in Table 33 . The more positive the attitude toward evaluation, the higher the rating was on these activities: doing homework, discussing a video tape, doing exercises in a workbook, writing answers to questions in a text, programmed instruction, working on an experiment or shop exercise, and doing a library or research paper. The items primarily come from the study-repetition and practice dimension.

COGNITIVE STYLE

Students were divided into three groups on the basis of their scores on the Cognitive Style Preference Inventory. The means and analysis of variance comparisons are given in Table 34 . There were four items in which there were significant differences between groups. Field Independent (low scorers) students tended to find more valuable than Field Dependent students, doing home-

TABLE XXXII

Evaluation of VTI Students
To Teaching/Learning Techniques
By CMI Attitude Toward Work

Technique	Low (74)	Medium (189)	High (93)	F 2/353
Written test	3.64	3.85	3.90	1.60
Viewing filmstrip	3.74	3.80	3.82	0.21
Listening to teacher talk	4.32	4.23	4.44	2.24
Watching exper./shop demonstration	4.45	4.50	4.58	0.48
Listening to record, tape	3.12	2.94	3.05	0.75
Doing homework	3.59	3.90	4.04	3.42
Reading textbook	3.64	3.99	4.04	3.92
Watching videotape	3.62	3.56	3.68	0.44
Watching movie	3.86	3.89	4.00	0.09
Asking teacher questions	4.59	4.34	4.55	2.82
Exercise in workbook	3.77	3.81	3.92	0.68
Discussing topic with class members	4.25	4.09	4.17	0.87
Perform experiment/shop exercise	4.60	4.34	4.71	5.55
Work experience	4.79	4.74	4.94	3.20
Writing answers to text questions	3.41	3.66	3.75	2.50
Discussing video tape	3.54	3.41	3.53	0.63
Answering others questions	3.67	3.63	3.87	1.88
Taking notes on reading	3.83	8.85	3.95	0.31
Individualized instruction	4.27	4.28	4.25	0.01
Giving report to class	2.62	2.74	2.77	0.41

TABLE XXXII

Evaluation of VTI Students
To Teaching/Learning Techniques
By CMI Attitude Toward Work

Continued

Technique	Low (74)	Medium (189)	High (83)	F 2/353
Working on project alone	3.93	3.91	4.12	1.40
Using the library	3.87	3.71	3.82	0.80
Programmed instruction	3.48	3.38	3.47	0.34
Answering teachers questions	3.79	3.88	3.74	0.96
Work on exper./shop exercise	4.27	4.21	4.39	1.11
Receiving good grades	4.36	4.27	4.09	1.64
Visiting a work site	4.25	4.30	4.33	0.15
Taking practical test	3.66	3.81	4.00	2.36
Gaming or simulation	3.09	3.07	3.28	1.12
Watching own videotape performance	2.95	3.01	3.14	0.53
Guest lecturers	3.79	3.60	3.72	0.92
Slide/lecture presentation	3.60	3.38	3.48	1.17
Computer for instructional purposes	3.24	2.93	3.08	2.60
Peer tutoring	3.51	3.31	3.41	0.82
Being tutored	4.05	3.92	4.12	1.29
Small group discussion	3.78	3.81	3.80	0.01
Writing a research paper	3.18	3.36	3.31	0.49
Watching craftsman demonstrate	4.37	4.34	4.43	0.27
Working with skilled craftsman	4.43	4.57	4.62	1.53

TABLE XXXIII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Their Attitude Toward Evaluation

Techniques	Low (35)	Medium (57)	High (44)	F 2/133
Written test	4.02	3.80	3.86	0.53
Viewing filmstrip	3.80	3.75	3.70	0.12
Listening to teacher talk	4.40	4.40	4.38	0.00
Watching exper./shop demonstration	4.45	4.64	4.68	1.02
Listening to record, tape	3.00	3.08	3.38	1.72
Doing homework	3.20	3.59	4.02	6.79
Reading textbook	3.94	4.03	4.11	0.37
Watching videotape	3.37	3.47	3.77	2.04
Watching movie	3.82	3.68	4.04	1.64
Asking teacher questions	4.42	4.50	4.65	0.76
Exercise in workbook	3.28	3.71	3.93	3.65
Discussing topic with class members	3.97	4.19	4.20	0.72
Perform experiment/ shop exercise	4.51	4.57	4.65	0.32
Work experience	4.48	4.73	4.88	2.05
Writing answers to text questions	3.11	3.45	3.95	6.10
Discussing videotape	2.97	3.21	3.72	5.92
Answering others questions	3.91	3.71	3.70	0.63
Taking notes on reading	3.94	3.64	4.13	2.92
Individualized instruction	4.33	4.33	4.65	2.61
Giving report to class	2.34	2.67	2.90	2.66

TABLE XXXIII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Their Attitude Toward Evaluation

Continued

Techniques	Low (35)	Medium (57)	High (44)	F 2/133
Working on project alone	4.08	4.29	4.36	1.02
Using the library	3.54	3.57	3.75	0.44
Programmed instruction	3.74	3.28	3.75	3.97
Answering teachers questions	4.11	3.86	4.11	1.44
Work on exper./shop exercise	3.91	4.21	4.54	4.31
Receiving good grades	3.80	3.75	4.06	0.99
Visiting a work site	4.08	4.19	4.18	0.20
Taking practical test	3.77	3.68	4.04	1.80
Gaming or simulation	3.11	3.05	3.20	0.24
Watching own videotape performance	2.65	3.03	2.95	1.35
Guest lecturers	3.42	3.86	3.59	2.29
Slide/lecture presentation	3.34	3.68	3.70	1.54
Computer for instructional purposes	2.68	2.84	3.00	0.99
Peer tutoring	3.40	3.50	3.41	0.26
Being tutored	3.51	3.75	3.93	1.36
Small group discussion	3.68	3.52	3.93	1.67
Writing a research paper	3.11	3.33	3.70	3.28
Watching craftsman demonstrate	4.02	4.31	4.38	2.35
Working with skilled craftsman	4.37	4.50	4.75	2.18

____ significant at or beyond the .05 level

TABLE XXXIV

Evaluation of VTI Students
To Teaching/Learning Techniques
By Cognitive Style

Technique	FI (33)	M (69)	FD (34)	F 2/133
Written test	4.21	3.95	3.41	6.13
Viewing filmstrip	3.66	3.81	3.70	0.38
Listening to teacher talk	4.54	4.36	4.32	0.85
Watching exper./shop demonstration	4.60	4.49	4.85	2.75
Listening to record, tape	2.93	3.27	3.14	1.25
Doing homework	3.90	3.66	3.29	3.15
Reading textbook	4.36	4.01	3.76	4.17
Watching videotape	3.30	3.52	3.82	2.61
Watching movie	3.63	3.88	3.94	0.92
Asking teacher questions	4.39	4.56	4.61	0.65
Exercise in workbook	3.75	3.73	3.47	0.81
Discussing topic with class members	4.03	4.20	4.11	0.36
Perform experiment/shop exercise	4.51	4.53	4.76	1.10
Work experience	4.84	4.65	4.73	0.55
Writing answers to text questions	3.75	3.46	3.44	0.90
Discussing videotape	3.24	3.23	3.55	1.21
Answering others questions	3.75	3.76	3.76	0.00
Taking notes on reading	3.90	3.98	3.64	1.24
Individualized instruction	4.42	4.40	4.52	0.29
Giving report to class	2.51	2.75	2.55	0.66

TABLE XXXIV

Evaluation of VTI Students
To Teaching/Learning Techniques
By Cognitive Style

Continued

Technique	FI (33)	M (69)	FD (34)	F 2/133
Working on project alone	4.51	4.17	4.20	1.76
Using the library	3.75	3.53	3.67	0.52
Programmed instruction	3.54	3.56	3.52	0.01
Answering teachers questions	4.09	4.10	3.73	2.28
Work on exper./shop exercise	4.45	4.05	4.41	2.57
Receiving good grades	3.81	3.78	4.08	0.83
Visiting a work site	4.12	4.13	4.26	0.35
Taking practical test	4.21	3.75	3.58	3.97
Gaming or simulation	3.00	3.20	3.05	0.46
Watching own videotape performance	2.81	2.92	2.97	0.17
Guest lecturers	3.48	3.62	3.91	1.70
Slide/lecture presentation	3.45	3.68	3.58	0.55
Computer for instructional purposes	2.66	2.87	3.00	0.97
Peer tutoring	3.54	3.43	3.29	0.38
Being tutored	3.78	3.78	3.64	0.18
Small group discussion	3.69	3.66	3.76	0.08
Writing a research paper	3.39	3.49	3.20	0.82
Watching craftsman demonstrate	4.27	4.15	4.47	1.87
Working with skilled craftsman	4.69	4.44	4.61	1.13

___ significant at or beyond the .05 level

work and taking examinations both written and practical and reading a textbook. The field independent students prefer more structure and traditional types of instructional methods. Field dependent students prefer instructional techniques which have more social interactions.

LOCUS OF CONTROL

The students who were given the Rotter Locus of Control Scale were divided into three groups: internal, middle and external. The items were compared by group and the results yielded are included in Table 35. There were five items on which the groups differed in their perceptions. Internals found work experience, individualized instruction and writing a research paper more helpful than did externals.

Externals rated working on an experiment or shop exercise with a small group of subjects more helpful than did the internals or middle group. The middle group had higher mean ratings of taking practical tests than did either internals or externals. Internals did not mind activities in which they could perform alone; externals preferred activities in group situations.

TABLE XXXV

Evaluation of VTI Students
To Teaching/Learning Techniques
By Locus of Control

Technique	Internals (63)	Middle (139)	Externals (69)	F 2/270
Written Test	4.00	3.91	3.63	2.85
Viewing Filmstrip	3.92	3.72	4.00	2.70
Listening to teacher talk	4.46	4.22	4.18	2.55
Watching Exper./Shop demonstration	4.49	4.39	4.52	0.59
Listening to record, tape	3.01	3.08	3.07	0.09
Doing homework	3.88	3.91	3.82	0.15
Reading textbook	4.07	3.90	4.13	1.65
Watching Videotape	3.66	3.61	3.87	1.67
Watching movie	3.98	3.97	4.14	0.87
Asking teacher questions	4.50	4.34	4.39	0.68
Exercise in workbook	3.74	3.71	3.68	0.07
Discussing topic with class members	3.88	4.16	4.26	2.79
Experiment or shop exercise	4.30	4.28	4.55	1.86
Work experience	4.85	4.63	4.79	3.23
Writing answers to text questions	3.68	3.55	3.68	0.58
Discussing video tape	3.33	3.48	3.40	0.48
Answering others questions	3.42	3.66	3.62	1.00
Taking notes on reading	3.92	3.61	3.88	2.09
Individualized instruction	4.39	3.97	4.21	4.22
Giving report to class	2.96	2.85	2.50	2.98

TABLE XXXV
Evaluation of VTI Students
To Teaching/Learning Techniques
By Locus of Control

CONTINUED

Technique	Internals (63)	Middle (139)	Externals (69)	F 2/270
Working on project alone	4.07	3.81	3.98	1.72
Using the library	3.93	3.71	3.81	1.22
Programmed instruction	3.46	3.38	3.47	0.22
Answering teachers questions	3.84	3.86	3.75	0.36
Work on Exper./shop exercise	4.27	3.99	4.37	3.80
Receiving good grades	4.34	4.15	4.13	0.89
Visiting a work site	4.27	4.19	4.17	0.18
Taking practical test	3.66	4.00	3.63	4.56
Gaming or simulation	3.15	3.00	2.94	0.69
Watching own videotape performance	3.30	3.10	2.94	1.61
Guest lecturers	3.63	3.79	3.63	0.83
Slide/lecture presentation	3.66	3.50	3.56	0.58
Computer for instructional purposes	3.14	3.03	2.89	0.97
Peer tutoring	3.28	3.34	3.59	1.51
Being tutored	4.19	3.90	3.92	1.59
Small group discussion	3.76	3.74	3.94	1.00
Writing a research paper	3.66	3.33	3.11	3.46
Watching craftsman demonstrate	4.27	4.25	4.30	0.07
Working with skilled craftsman	4.55	4.31	4.46	1.40

WORK ENVIRONMENT PREFERENCE

The students' responses to the 39 items was compared by the four dimensions making up the Work Environment Preference Schedule and the total score on the inventory. The groups were subdivided at the quartiles wherever possible. Three groups were identified: low, middle and high. Analysis of variance was computed on each item by group and by dimension.

The first dimension was self subordination. Those in the low group would tend to disagree that people at higher levels are in the best position to make decisions for them. The means and F values are given in Table 36 . Only two of the thirty-nine comparisons were significant. Individuals high on the self-subordination dimension felt that receiving good grades was more helpful than individuals in the average or middle group and those who scored low on the scale. There were also differences in how groups perceived writing a research paper. The average or middle group viewed this exercise more positively than either those high or low in self-subordination.

The comparison of groups on the impersonalization dimension is reported in Table 37 . There were only two items where there were significant differences. Students who tended to be high on this dimension, i.e. felt that the relationships within an organization should be based on position and level rather than on personal considerations ranked writing answers to questions in the text, and simulation/gaming exercises on the computer more valuable than those average or low on the dimension. These are non social or personal types of instruction.

TABLE XXXVI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Self Subordination Dimension of(WEPS)Work Environment Preference Schedule

Technique	Self Subordination Low (89)	Medium (188)	High (98)	F 2/374
Written test	3.75	4.03	3.92	2.63
Viewing filmstrip	3.69	3.63	3.82	1.30
Listening to teacher talk	4.11	4.29	4.24	1.44
Watching exper./shop demonstration	4.48	4.44	4.63	1.64
Listening to record, tape	2.93	3.06	3.08	0.70
Doing homework	3.93	4.02	3.83	1.23
Reading textbook	4.00	4.10	4.01	0.63
Watching videotape	3.60	3.51	3.66	0.67
Watching movie	3.78	3.77	3.85	0.21
Asking teacher questions	4.39	4.44	4.38	0.20
Exercise in workbook	3.61	3.70	3.77	0.50
Discussing topic with class members	3.92	4.04	4.26	2.88
Perform experiment /shop exercise	4.41	4.36	4.48	0.35
Work experience	4.70	4.60	4.75	0.93
Writing answers to text questions	3.47	3.58	3.68	0.82
Discussing videotape	3.29	3.36	3.56	1.49
Answering others questions	3.50	3.62	3.56	0.34
Taking notes on reading	3.50	3.80	3.62	2.26
Individualized instruction	4.22	4.24	4.35	0.60
Giving report to class	2.62	2.70	2.66	0.12

TABLE XXXVI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Self Subordination Dimension of WEPS Work Environment Preference Schedule

Continued

Technique	Self Subordination Low (89)	Medium (188)	High (98)	F 2/374
Working on project alone	3.76	3.93	4.09	2.29
Using the library	3.59	3.89	3.80	2.72
Programmed instruction	3.38	3.41	3.48	0.23
Answering teachers questions	3.71	3.81	3.82	0.40
Work on exper./shop exercise	4.10	4.19	4.41	2.68
Receiving good grades	4.15	4.23	4.56	4.79
Visiting a work site	4.37	4.22	4.36	1.13
Taking practical test	3.70	3.85	3.74	0.69
Gaming or simulation	2.84	2.99	3.02	0.72
Watching own videotape performance	2.79	2.82	3.07	1.69
Guest lecturers	3.51	3.73	3.79	1.90
Slide/lecture presentation	3.34	3.49	3.67	2.23
Computer for instructional purposes	2.78	3.02	2.99	1.42
Peer tutoring	3.22	3.35	3.61	2.76
Being tutored	3.82	4.03	3.91	1.07
Small group discussion	3.48	3.66	3.77	1.55
Writing a research paper	3.01	3 44	3.16	4.26
Watching craftsman demonstrate	4.13	4.23	4.35	1.16
Working with skilled craftsman	4.42	4.35	4.56	1.27

TABLE XXXVII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Impersonalization Dimension
Of Work Environment Preference Scale

Technique	Low (102)	Medium (191)	High (82)	F 2/374
Written test	3.90	3.95	3.93	0.11
Viewing filmstrip	3.84	3.60	3.75	2.39
Listening to teacher talk	4.15	4.28	4.22	0.85
Watching exper./shop demonstration	4.42	4.51	4.58	0.90
Listening to record, tape	3.02	3.02	3.09	0.18
Doing homework	3.96	3.98	3.86	0.44
Reading textbook	4.17	4.04	3.93	1.74
Watching videotape	3.50	3.57	3.68	0.68
Watching movie	3.83	3.81	3.72	0.29
Asking teacher questions	4.52	4.43	4.25	2.17
Exercise in workbook	3.72	3.62	3.84	1.18
Discussing topic with class members	4.17	3.99	4.13	1.33
Perform experiment/shop exercise	4.23	4.46	4.50	1.87
Work experience	4.68	4.65	4.68	0.05
Writing answers to text questions	3.55	3.46	3.87	3.93
Discussing videotape	3.37	3.35	3.53	0.79
Answering others questions	3.63	3.49	3.69	1.09
Taking notes on reading	3.67	3.64	3.78	0.38
Individualized instruction	4.24	4.29	4.24	0.12
Giving report to class	2.63	2.65	2.78	0.44

TABLE XXXVII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Impersonalization Dimension
Of Work Environment Preference Scale

Continued

Technique	Low (102)	Medium (191)	High (82)	F 2/374
Working on project alone	3.92	3.90	4.02	0.37
Using the library	3.85	3.79	3.74	0.27
Programmed instruction	3.37	3.37	3.58	1.36
Answering teachers questions	3.85	3.78	3.75	0.30
Work on exper./shop exercise	4.09	4.28	4.26	1.31
Receiving good grades	4.28	4.24	4.46	1.45
Visiting a work site	4.27	4.35	4.20	0.77
Taking practical test	3.72	3.82	3.78	0.31
Gaming or simulation	2.74	2.96	3.24	4.66
Watching own videotape performance	2.78	2.82	3.14	2.64
Guest lecturers	3.66	3.71	3.70	0.06
Slide/lecture presentation	3.57	3.41	3.62	1.37
Computer for instructional purposes	2.82	2.93	3.18	2.53
Peer tutoring	3.35	3.33	3.58	1.45
Being tutored	3.95	3.96	3.91	0.06
Small group discussion	3.69	3.60	3.69	0.27
Writing a research paper	3.38	3.22	3.24	0.58
Watching craftsman demonstrate	4.11	4.24	4.40	1.85
Working with skilled craftsman	4.47	4.39	4.45	0.21

The comparison of groups on rule conformity is presented in Table 38. There were three items in which the groups differed. Those who were more committed to following rules and regulations exactly felt that doing exercises in the workbook, programmed instruction and having guest lecturers were more helpful than those who were average or low on rule conformity.

The fourth dimension was traditionalism. The means and F values from the analysis of variance are listed in Table 39 . There were four items in which there were significant differences between groups. Those who were more conforming valued receiving good grades, using the computer for instructional purposes, and working with programmed instruction more helpful in the learning process than those scoring lower on the scale. There was a difference on how the groups rated watching a movie. The high and low groups on the traditionalism scale viewed this activity less helpful than those in the average range.

There were five items with significant differences between the mean scores on the total score of the WEPS. See Table 40 . Conformist (high group) found more helpful discussing video tapes or instructional T.V., performing on video tape, using the computer for instructional purposes, and taking notes on reading more helpful than those with lower scores. Nonconformist (low group) found programmed instruction less helpful than the higher two groups. In other words, the conformists were more accepting of any mode especially those involving hardware and less personal techniques.

TABLE XXXVIII

Evaluation of VTI Students
To Teaching/Learning Techniques
By WEPS Rule of Conformity Dimension
Of Work Environment Preference Scale

Technique	Low (63)	Medium (248)	High (64)	F 2/372
Written test	3.68	4.00	3.95	2.84
Viewing filmstrip	3.79	3.63	3.87	2.07
Listening to teacher talk	4.01	4.28	4.28	2.74
Watching exper./shop demonstration	4.39	4.49	4.64	1.39
Listening to record, tape	3.06	3.01	3.12	0.35
Doing homework	3.93	3.99	3.81	0.91
Reading textbook	4.03	4.06	4.06	0.03
Watching videotape	3.63	3.53	3.68	0.66
Watching movie	3.77	3.76	3.95	0.83
Asking teacher questions	4.44	4.45	4.25	1.46
Exercise in workbook	3.68	3.66	3.85	3.70
Discussing topic with class members	4.19	4.00	4.23	1.89
Perform experiment/shop exercise	4.31	4.41	4.46	0.33
Work experience	4.61	4.62	4.89	2.23
Writing answers to text questions	3.41	3.58	3.75	1.43
Discussing videotape	3.39	3.34	3.59	1.20
Answering others questions	3.63	3.52	3.71	0.83
Taking notes on reading	3.47	3.71	3.79	1.41
Individualized instruction	4.19	4.24	4.45	1.57
Giving report to class	2.71	2.62	2.82	0.82

TABLE XXXVIII

Evaluation of VTI Students
To Teaching/Learning Techniques
By WEPS Rule of Conformity Dimension
Of Work Environment Preference Scale

Continued

Technique	Low (63)	Medium (248)	High (64)	F 2/372
Working on project alone	3.87	3.90	4.10	1.08
Using the library	3.58	3.84	3.84	1.73
Programmed instruction	3.04	3.50	3.48	5.22
Answering teachers questions	3.68	3.83	3.75	0.79
Work on exper./shop exercise	4.06	4.28	4.18	1.36
Receiving good grades	4.17	4.27	4.51	2.07
Visiting a work site	4.23	4.27	4.46	1.40
Taking practical test	3.69	3.80	3.82	0.30
Gaming or simulation	2.69	2.98	3.14	2.68
Watching own videotape performance	2.74	2.85	3.10	1.64
Guest lecturers	3.73	3.61	4.00	3.60
Slide/lecture presentation	3.38	3.50	3.65	1.08
Computer for instructional purposes	2.73	3.00	3.00	1.61
Peer tutoring	3.30	3.36	3.59	1.21
Being tutored	3.84	3.94	4.07	0.67
Small group discussion	3.50	3.66	3.75	0.73
Writing a research paper	3.27	3.24	3.35	0.21
Watching craftsman demonstrat.	4.11	4.23	4.42	1.58
Working with skilled craftsman	4.42	4.38	4.59	1.06

TABLE XXXIX

Evaluation of VTI Students
To Teaching/Learning Techniques
By WEPS Traditionalism Dimension
Of Work Environment Preference Schedule

Techniques	Low (95)	Medium (195)	High (85)	F 2/372
Written test	3.87	3.96	3.94	0.32
Viewing filmstrip	3.64	3.73	3.68	0.35
Listening to teacher talk	4.16	4.29	4.18	0.91
Watching exper./shop demonstration	4.46	4.54	4.45	0.45
Listening to record, tape	3.07	3.02	3.03	0.07
Doing homework	3.95	3.99	3.85	0.56
Reading textbook	4.11	4.09	3.89	1.92
Watching videotape	3.58	3.52	3.67	0.54
Watching movie	3.68	3.93	3.61	3.49
Asking teacher questions	4.35	4.46	4.37	0.63
Exercise in workbook	3.70	3.65	3.81	0.67
Discussing topic with class members	4.07	4.03	4.16	0.51
Perform experiement/shop exercise	4.32	4.43	4.44	0.37
Work experience	4.53	4.66	4.82	2.17
Writing answers to text questions	3.48	3.52	3.81	2.37
Discussing videotape	3.30	3.41	3.47	0.49
Answering others questions	3.65	3.52	3.61	0.44
Taking notes on reading	3.60	3.66	3.82	0.91
Individualized instruction	4.31	4.27	4.21	0.28
Giving report to class	2.86	2.56	2.71	2.22

TABLE XXXIX

Evaluation of VTI Students
To Teaching/Learning Techniques
By WEPS Traditionalism Dimension
Of Work Environment Preference Schedule

Continued

Techniques	Low (95)	Medium (195)	High (85)	F 2/372
Working on project alone	3.92	3.87	4.08	1.14
Using the library	3.75	3.82	3.80	0.12
Programmed instruction	3.17	3.47	3.56	3.88
Answering teachers questions	3.72	3.87	3.69	1.49
Work on exper./shop exercise	4.10	4.27	4.27	1.05
Receiving good grades	4.03	4.32	4.42	4.82
Visiting a work site	4.25	4.31	4.30	0.17
Taking practical test	3.72	3.82	3.78	0.26
Gaming or simulation	2.78	2.96	3.16	2.57
Watching own videotape performance	2.75	2.85	3.09	1.95
Guest lecturers	3.84	3.63	3.69	1.32
Slide/lecture presentation	3.42	3.57	3.43	0.96
Computer for instructional purposes	2.72	2.95	3.21	4.42
Peer tutoring	3.31	3.79	3.50	0.61
Being tutored	4.06	3.88	3.97	0.77
Small group discussion	3.68	3.67	3.56	0.31
Writing a research paper	3.17	3.34	3.20	0.73
Watching craftsman demonstrate	4.18	4.20	4.41	1.53
Working with skilled craftsman	4.44	4.41	4.44	0.05

TABLE XXXX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Total Score on Work Environment Preference Schedule

Technique	Low (92)	Medium (184)	High (99)	F 2/372
Written test	3.81	3.96	4.01	1.11
Viewing filmstrip	3.68	3.72	3.67	0.09
Listening to teacher talk	4.10	4.27	4.28	1.47
Watching exper./shop demonstration	4.37	4.54	4.54	1.59
Listening to record, tape	3.00	3.03	3.09	0.21
Doing homework	3.91	3.98	3.92	0.20
Reading textbook	4.06	4.07	4.02	0.11
Watching videotape	3.48	3.57	3.65	0.60
Watching movie	3.73	3.88	3.67	1.14
Asking teacher questions	4.48	4.39	4.40	0.41
Exercise in workbook	3.68	3.62	3.89	1.78
Discussing topic with class members	4.14	3.96	4.20	2.02
Perform experiment /shop exercise	4.33	4.39	4.50	0.63
Work experience	4.64	4.62	4.78	1.12
Writing answers to text questions	3.46	3.51	3.8'	3.06
Discussing videotape	3.31	3.35	3.54	1.18
Answering others questions	3.58	3.56	3.59	0.02
Taking notes on reading	3.43	3.73	3.81	3.11
Individualized instruction	4.26	4.26	4.29	0.04
Giving report to class	2.70	2.56	2.84	1.98

TABLE XXXX

Evaluation of VTI Students
To Teaching/Learning Techniques
By Total Score on Work Environment Preference Schedule

Continued

Technique	Low (92)	Medium (184)	High (99)	F 2/372
Working on project alone	3.87	3.90	4.06	0.98
Using the library	3.63	3.89	3.78	2.12
Programmed instruction	3.17	3.51	3.47	3.70
Answering teachers questions	3.68	3.86	3.76	1.25
Work on exper./shop exercise	4.06	4.27	4.31	1.81
Receiving good grades	4.15	4.27	4.48	2.79
Visiting a work site	4.30	4.31	4.26	0.11
Taking practical test	3.66	3.85	3.78	1.02
Gaming or simulation	2.81	2.93	3.16	2.46
Watching own videotape performance	2.77	2.77	3.19	4.65
Guest lecturers	3.69	3.67	3.74	0.16
Slide/lecture presentation	3.35	3.55	3.55	1.19
Computer for instructional purposes	2.70	2.97	3.15	4.00
Peer tutoring	3.35	3.34	3.51	0.75
Being tutored	3.91	3.96	3.97	0.07
Small group discussion	3.57	3.67	3.67	0.25
Writing a research paper	3.12	3.27	3.39	1.16
Watching craftsman demonstrate	4.12	4.25	4.35	1.31
Working with skilled craftsman	4.41	4.41	4.45	0.04

HOLLAND'S SIX TYPES OF PERSONALITY

The students were classified into one of the six personality types outlined by Holland in his theory of vocational choice. An one way analysis of variance was computed on the 39 items by type and the means and F values are reported in Table 41. See Appendix G for the Six Personality Types.

There were significant differences on 32 of the 39 items. There were no significant differences on how the six types viewed lecture by teacher, asking teacher questions, having work experience, answering questions of others, individualized instruction, group discussion and working with a craftsman. These items basically are the ones rated extremely helpful by all students regardless of program or classification.

Conventionals who are supposed to be conforming, conscientious, orderly and self-controlled according to Holland had the highest mean scores on doing homework, doing exercises in the workbook, taking notes on reading, working with programmed instructional materials and meeting with small groups for discussion.

Enterprising students characterized as being energetic, exhibitionistic, argumentative, self-confident and sociable had the highest mean scores on giving reports in class, performing on video tape, being tutored and answering questions in the text.

Social individuals are supposed to be responsible and cooperative and had the highest mean ratings on answering teacher questions, receiving good grades, visiting a work site, taking a written or practical test, listening to a guest lecturer, on the value of filmstrips, movies and video tapes or instructional

T.V. as well as reading the textbook, using the library or reference room and writing a research paper.

Artistic persons have as characteristics, independence, introspection and originality. In this sample they had the highest means on lecture method, watching an experiment or shop demonstration, having work experience, answering questions of others, working on a project by self, working on experiment or shop exercise, watching demonstrations by craftsman and working with a craftsman.

The investigative group had the highest mean rating on answering teacher questions and receiving instruction from other students. The students are thought to be analytical and intellectual.

The realistic group scored highest on only two items also, participating in an experiment or shop demonstration. They ranked second among the groups in working on a project by self and watching a demonstration by a craftsman.

TABLE XXXXI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Holland's Six Types

Technique	1 (619)	2 (374)	3 (36)	4 (203)	5 (63)	6 (56)	F 5/1345
Written test	3.79	3.88	3.63	4.17	3.82	3.82	5.88
Viewing filmstrip	3.79	3.73	3.66	4.00	3.61	3.53	4.58
Listening to teacher talk	4.27	4.22	4.37	4.35	4.33	4.31	0.96
Watching exper./shop demonstration	4.64	4.46	4.65	4.51	4.31	4.35	5.42
Listening to record, tape	3.10	2.92	3.42	3.16	3.24	3.35	4.06
Doing homework	3.68	4.04	4.14	4.15	4.17	4.22	14.15
Reading textbook	4.02	4.06	3.66	4.15	3.92	3.71	3.82
Watching videotape	3.63	3.52	3.47	3.95	3.66	3.77	6.33
Watching movie	3.90	3.81	3.88	4.37	3.93	4.01	11.56
Asking teacher questions	4.42	4.48	4.55	4.52	4.46	4.61	1.06
Exercise in workbook	3.63	3.79	3.61	3.97	4.14	4.24	9.84
Discussing topic with class members	4.15	4.17	4.13	4.14	4.14	4.29	0.32
Perform experiment/shop exercise	4.68	4.48	4.68	4.29	4.25	4.03	12.65
Work experience	4.76	4.81	4.90	4.88	4.72	4.86	1.87
Writing answers to text questions	3.52	3.63	3.73	3.84	3.88	3.77	4.45
Discussing videotape	3.38	3.34	3.44	3.83	3.42	3.77	8.83
Answering others questions	3.62	3.75	3.94	3.70	3.82	3.91	2.04
Taking notes on reading	3.68	3.83	4.00	4.03	4.00	4.16	5.49
Individualized instruction	4.27	4.34	4.61	4.27	4.32	4.16	1.46
Giving report to class	2.58	2.72	2.66	2.89	3.11	2.71	4.05

1 = Realistic 2 = Investigative 3 = Artistic 4 = Social
5 = Enterprising 6 = Conventional

TABLE XXXXI

Evaluation of VTI Students
To Teaching/Learning Techniques
By Holland's Six Types

Continued

Techniques	1 (619)	2 (374)	3 (36)	4 (203)	5 (63)	6 (56)	F 5/1345
Working on project alone	4.21	3.90	4.37	3.76	3.63	3.49	14.93
Using the library	3.64	3.74	3.74	4.10	4.06	4.08	9.90
Programmed instruction	3.40	3.42	3.52	3.59	3.64	3.84	3.55
Answering teachers questions	3.79	3.87	3.66	4.03	3.81	3.66	3.28
Work on exper./shop exercise	4.30	4.07	4.44	4.35	4.19	4.36	4.22
Receiving good grades	4.12	4.15	4.33	4.56	4.14	4.49	7.54
Visiting a work site	4.26	4.26	4.36	4.47	4.17	4.24	2.29
Taking practical test	3.74	3.96	3.41	4.03	3.69	3.80	5.70
Gaming or simulation	2.90	3.20	3.44	3.17	3.65	3.57	12.43
Watching own videotape performance	2.94	2.94	3.08	3.30	3.47	3.08	6.02
Guest lecturers	3.66	3.58	3.38	3.99	3.90	3.83	6.12
Slide/lecture presentation	3.57	3.38	3.44	3.78	3.50	3.55	4.41
Computer for instructional purposes	3.80	3.26	3.48	3.20	3.41	3.24	16.79
Peer tutoring	3.40	3.63	3.58	3.27	3.44	3.36	3.47
Being tutored	3.77	4.12	3.97	4.21	4.26	4.19	10.10
Small group discussion	3.67	3.73	3.80	3.99	4.01	4.16	5.76
Writing a research paper	3.27	3.18	3.19	3.71	3.50	3.36	6.28
Watching craftsman demonstrate	4.40	4.27	4.66	4.36	4.23	4.10	3.41
Working with skilled craftsman	4.54	4.56	4.80	4.58	4.44	4.36	1.78

1 = Realistic 2 = Investigative 3 = Artistic 4 = Social

5 = Enterprising 6 = Conventional

GRADE POINT AVERAGE

The students were asked to indicate their grade point average on a five point scale, 0 to 4. Students were classified on the basis of their responses into four categories A thru D. There were significant differences between the means of the four groups on 23 of the 39 items. The results are presented in Table 42.

In general, the typical pattern on quite a few items was that the higher the grade average, the higher the item was rated; the lower the grade point average, the lower the item was rated. This was the pattern on items such as taking a written test, listening to a teacher talk about a topic, performing an experiment or shop exercise, working on a project by myself, writing a research paper, and watching a demonstration of a craftsman. There were, however, some exceptions to this pattern. For example on the reinforcement-repetition-study dimension D students felt that doing an exercise in the workbook, answering questions on the text were more helpful than students having higher averages. D and A students had the same means, higher than B and C students on taking notes on reading.

Reading my textbook was rated highest by the A students but second highest by the D students.

Also, on the audio visual dimension, D students felt that movies and slide/lecture presentations were more helpful than students with higher grades.

In general, D students felt that active participation in the learning process aided learning and receiving the information through a number of different communication patterns.

Pearson product moment correlations were computed between the items on the survey and the grade point average of students. The correlations showed just zero or no relationship. The ratings on the inventory were independent of grade point average.

TABLE XXXXII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Their Grade Point Average

Technique	D (26)	C (401)	B (735)	A (66)	F 3/1224
Written test	3.69	3.79	3.94	3.95	2.84
Viewing filmstrip	3.65	3.69	3.81	4.00	3.27
Listening to teacher talk	4.07	4.22	4.29	4.60	5.33
Watching exper./shop demonstration	4.65	4.46	4.56	4.78	4.46
Listening to record, tape	3.03	3.10	3.06	3.15	0.28
Doing homework	3.96	3.94	3.90	4.16	1.60
Reading textbook	4.34	3.93	4.04	4.40	6.60
Watching videotape	3.56	3.56	3.64	3.96	3.68
Watching movie	4.23	3.90	3.94	4.15	2.19
Asking teacher questions	4.40	4.37	4.51	4.70	4.94
Exercise in workbook	4.30	3.74	3.77	3.93	3.56
Discussing topic with class members	4.20	4.19	4.15	4.24	0.36
Perform experiment/shop exercise	4.38	4.44	4.60	4.78	6.51
Work experience	4.73	4.76	4.81	4.98	3.10
Writing answers to text questions	3.96	3.63	3.62	3.56	1.08
Discussing videotape	3.52	3.37	3.49	3.63	2.02
Answering others questions	3.84	3.53	3.78	3.93	6.94
Taking notes on reading	4.15	3.79	3.78	4.15	3.28
Individualized instruction	4.34	4.23	4.31	4.66	4.47
Giving report to class	2.64	2.63	2.74	2.83	1.20

TABLE XXXXII

Evaluation of VTI Students
To Teaching/Learning Techniques
By Their Grade Point Average

Continued

Technique	D (26)	C (401)	B (735)	A (66)	F 2/1224
Working on project alone	3.65	3.93	4.05	4.24	3.60
Using the library	3.76	3.68	3.83	3.96	2.94
Programmed instruction	3.61	3.44	3.46	3.50	0.32
Answering teachers questions	4.04	3.75	3.89	3.97	3.16
Work on exper./shop exercise	4.26	4.22	4.24	4.20	0.12
Receiving good grades	4.08	4.15	4.26	4.27	1.13
Visiting a work site	4.40	4.15	4.34	4.43	5.03
Taking practical test	3.80	3.76	3.90	4.00	2.35
Gaming or simulation	3.03	3.03	3.16	3.15	1.37
Watching own videotape performance	3.00	3.05	3.01	3.07	0.14
Guest lecturers	3.60	3.52	.80	3.83	6.80
Slide/lecture presentation	3.64	3.40	.0	3.60	3.53
Computer for instructional purposes	2.88	3.09	3.06	3.15	0.60
Peer tutoring	3.50	3.54	3.41	3.56	1.30
Being tutored	4.00	3.89	4.05	3.80	2.87
Small group discussion	3.50	3.79	3.78	3.95	1.05
Writing a research paper	3.19	3.20	3.39	3.43	2.55
Watching craftsman demonstrate	3.96	4.23	4.41	4.55	7.62
Working with skilled craftsman	4.53	4.46	4.61	.56	3.44

OTHER HELPFUL LEARNING STYLES

The students were asked about what other learning styles were helpful to them. Approximately three quarters of the group listed one or more styles. A content analysis was made of the responses and they were categorized into five areas: instructional techniques, teacher characteristics, environmental climate, study techniques and type of instruction unit. A random selection of the actual comments of the students is presented in Appendix E.

The frequency of instructional techniques listed by the students corresponded with the ratings students made on the Ways of Learning survey. Most frequently mentioned was on-the-job training; hands-on-experience, working on the job, or apprenticeships. Next in order, were the areas of demonstration, observing craftsmen, having equipment in front of them when discussing it, etc.

Students liked the lecture method, especially when combined with practice or application. Discussion type of experiences such as classroom, small group, debating and panel discussions were seen as valuable.

Students felt that examinations helped them learn. They liked different types of tests written, oral and practical. Some liked little quizzes and frequent tests especially when they received feedback on how they did.

The use of different types of audiovisuals, homework, and simulation were also frequently mentioned.

Many of the students responded to the question in terms of teacher characteristics they preferred. Their model teacher would be knowledgeable in his field, available to them when they need help, able to motivate them, willing

to answer questions, able to create a positive learning environment, interested in and concerned with them, provides positive reinforcement and support, and is open.

Not mentioned in the Ways of Learning Inventory but mentioned by the students were having the instructors provide them with a list of course objectives.

Students also listed study techniques that they found helpful such as reading aloud, sitting alone by myself and reading the material, taking notes, etc.

They also listed characteristics of the environment they found conducive to learning such as a quiet one, clean one, one with soft music, relaxed, low pressure one and one without high anxiety.

Many mentioned the type of instructional unit. Some preferred working in groups, others alone. Some liked small groups others liked to have the whole class as a group.

MOST EFFICIENT AND EFFECTIVE LEARNING STYLE

Students were asked to write what they thoughtwas the most effective and efficient learning style for them. Approximately three quarters of the sample responded. A sample of the responses are included in Appendix F . A summary of the items listed by students is reported in Table 43.

By far the most efficient and effective learning syle was participative learning i.e. by doing, work experience, shop exercises. Students preferred visual as well as auditory presentations. Demonstrations, experiments as well as all types of audio visuals aided their learning.

Repetition and practice was an important component, i.e. having drill, having application exercises, being able to try things and make errors.

Students felt that discussion groups, being able to ask the teacher questions, etc.helped clarify their understanding of the subjects they were studying.

Student preference for the type of instructional unit varied. Some preferred to do things alone, some in small groups, others with the whole class.

Quite a number of students felt that beyond the instructional techniques an important dimension of whether they learned or not, depended upon their motivation and interest and study techniques Students reported different modes of study which they found helpful to them.

TABLE XXXXIII

Most Efficient and Effective Learning Styles
Listed By VTI Students

Instructional Technique

having programmed texts
watching and working with craftsman
on the job experience and training
working with my hands in shop
having shop exercises and projects
classroom lectures, demonstrations and discussions
lecture, notes, frequent quizzes
being able to ask questions about things not understood
field trips to work sites
watching demonstration and then being able to do it
being able to try things and make errors
seeing it on film, videotape, filmstrips, learning better from visual presentation
providing reinforcement, repetition, drill, homework
independent study, projects, research
having a worksheet provide outlining the major points

Teacher Characteristics

well organized teacher
well informed teacher
creates relaxed, informal atmosphere
one who allows 2- way talking, not just lectures

Instructional unit

working by myself, doing it myself
one to one tutoring with the instructor
working with a small group on a project
working with the instructor alone
working with a skilled craftsman in an actual work environment
to be left by self and study

Study Techniques

study alone, then discuss and debate with classmates
reading my assignments, listening to the instructor, taking good notes and studying for the test
read thoroughly and outline
doing questions at end of chapter
applying experiences to own work
being interested in what you are learning
reading over and over
talking about what I am doing
practice until I get it right

TABLE XXXXIII continued

paying close attention in class
studying in the library
keeping a notebook
answering questions of others about topic
staping notes to bedroom ceiling or wall

Learning environment

quiet
clean
soft music
low pressure
low anxiety situation
relaxed

COMPARISON OF TEACHER AND STUDENT DATA

The surveys given to both the faculty and students contained 14 common items. These items are listed by how each group ranked them in Table 44. Both faculty and students view lecture, demonstrations, laboratory/shop exercises and discussion as important teaching/learning techniques. All the items except for lecture require a high level of student teacher interaction. Students in both their responses to the objective and open ended questions like a high degree of teacher-student interaction. Students give high ratings to working with a craftsman, participating in a demonstration and being able to ask the instructor questions. Both faculty and students find that learning is facilitated from this type of interaction.

An area that both groups felt contributed in a moderate degree toward learning was being allowed to do or assigned independent study. Both groups probably feel that there are a certain number of individuals who can profit from this type of learning experience. Some students dislike working alone and without continual guidance in the learning process.

The techniques that both faculty and students rated lowest were those involving the use of hardware such as the computer or video tape recorder or software, programmed instruction. These techniques, of course, require less human interaction.

There were differences in how students and faculty viewed examinations and homework. Faculty tend to view these techniques as helpful instructional techniques and techniques that provide reinforcement and practice for the students. They probably perceive this information as important in providing feedback or evaluation of how well students are getting the material.

TABLE XXXXIV

Ranking of Common Teaching/Learning Styles
By VTI Faculty and Students

FACULTY TECHNIQUE	RANK (21 Items)	STUDENTS TECHNIQUE	RANK (39 Items)
Lecture	1	Demonstration	3
Written exam	2	Individualized Instruction	7
Demonstration	3	Field trips	8
Homework	4	Lecture	9
Practical exam	5	Lab/shop	10
Lab/shop	6	Discussion	12
Discussion	7	Independent study	14
Individualized instruction	9	Homework	17
Research papers	12	Written exam	18
Peer teaching	13	Practical exam	19
Independent study	14	TV/video tape	28
Field trips	16	Programmed instruction	33
Programmed instruction	17	Research papers	34
TV/video tape	19		

Students tend to have built up negative feelings toward examinations and probably perceive tests as the means of evaluating their performance rather than as having instructional value.

There were differences in how students and faculty viewed individualized instruction. Students rated this much higher than did faculty. Students like the one to one relationship with the teacher and instruction geared to their ability and achievement level.

Peer instruction was perceived by both faculty and students as having limited value. Probably on the VTI setting, there is a heavy reliance on skill development and modeling by craftsmen and less stress on the ability to transmit knowledge. Students might tend to feel cheated if receiving instruction from a peer rather than a skilled craftsman.

Field trips were seen as more valuable by students than faculty. Some faculty may feel that the scheduling and time in transportation might not bring about as good instructional results as other techniques. New faculty members might not know what resources are available in the area. Students like activities which involve interaction and doing.

Holland's personality classifications were used to classify both the major of the students and the teaching areas of the faculty. Students and teachers when assigned by type tend to have certain type of preferences for teaching/learning activities. Certain types of instructional environments tend to be more congruent for teaching certain subject areas. Students who have faculty members with the same type of preferences probably like the class-

room climate and rate these techniques more favorably. Students who have opposite preferences to the teaching environment utilized by the instructor probably rate the instructor and his techniques low.

In general, both teachers and instructors at the VTIs prefer the more traditional teaching techniques and those "hands on" approaches commonly used in shop or laboratory courses. Teachers frequently use more faculty centered approaches such as lecture, demonstration and assignment of homework. Each of these activities requires a high level of involvement of the teacher to organize, instruct and evaluate. Students in these activities are in a more passive role characterized by listening, watching and reciting.

Students, in turn, prefer more active roles which involve doing such as work experience, working with a craftsman, participating in a demonstration and asking the instructors questions. These type of activities imply a high level of involvement on the part of the students as well as faculty. Students want to be involved as a partner in the learning process. They do not like to be in a subordinate role. There is a clear implication that students feel the more actively they are involved in the learning process, the more they can learn.

CONCLUSIONS AND IMPLICATIONS

This section covers the results of the analysis of the faculty data, the student data and then a comparison of the two sets of data. In the final section of the chapter the implications of the study are discussed.

Faculty Data

1. The six most widely used teaching techniques of the 21 presented in the Vocational Technical Institues are:

   A. lecture

   B. written examinations

   C. demonstrations

   D. homework

   E. practical examinations

   F. laboratory/shop

2. The least used techniques of the 21 presented are:

   A. computer assisted instruction

   B. instructional television

   C. video taping

   D. programmed instruction

   E. recitation

   F. panel presentations

In general more traditional didactic methods are being used in instruction, probably differing little from those used in high schools or in colleges.

Partly little use might be made of techniques involving hardware since the cost prevents the hardware from being readily available to faculty and students.

3. The techniques utilized depend partly upon the personality of the instructor and the type of learning environment associated with the field. There were differences on six instructional techniques when compared by the six personality types and environments identified by Holland in his theory of career choice.

4. Realistic teachers made more frequent use of demonstration, field trips, films, filmstrips, individualized instruction, peer teaching than the other groups.

5. Investigative teachers made more frequent use of laboratory and shop techniques than the other group.

6. The artistic group, consisting of teachers of English for example, made the most use of library or research papers.

Teaching experience, number of years of teaching in general and at the VTI level was a factor in the utilization of certain teaching techniques.

7. Beginning teachers with 3 years or less experience tended to use programmed instruction more than more experienced teachers.

8. Teachers in the mid range (4 to 13 years of experience) utilized field trips more than teachers with less experience or more experience.

For beginning teachers there may be a shorter time gap between when they were in school and when they started teaching and they may have been exposed to more of the newer techniques in their studies. Teachers in the mid range probably have a greater knowledge of the resources in the area and can make more productive use of field trips than beginning teachers and maybe more flexible than more experienced teachers in the methods they use.

There were differences also by number of years taught at the VTI level. It should be pointed out, however, that on the utilization of the majority of teaching techniques there were no differences by years of teaching experience or years taught at the VTI level.

9. Drill sessions were used by teachers with less VTI experience than those having more experience.

Experienced teachers probably are better able to present their subject matter because they have taught the courses before and have better knowledge of the students.

10. Teachers with less experience at the VTI level tend to utilize student led discussions more than teachers with 9 or more years of experience.

Possibly these teachers have had more experience in student centered types of situations and are comfortable in this type of environment. The more experienced teachers might not have had as much experience in this style or not feel comfortable using this method.

There were differences between frequency of techniques used when the faculty was grouped into general areas such as automotive, building trades, electricity-electronics, environmental, marine, secretarial, food services, health related, support services, industrial, and business related.

11. Health, food services, building trades, environment and automotive made more frequent use of films than did the secretarial, business, industrial and support areas.

12. Field trips were more frequently used in the environmental, business, marine, food services and building trades programs than in the others.

13. Library and/or research papers were used most frequently by the health services, food services and building trades groups.

14. Laboratory and shop methods were extensively used in the industrial, automotive, building trades, environmental and electricity-electronics programs.

15. Peer teaching techniques were utilized more often by the food services, building trades and industrial instructors than by others.

16. The recitation method was more frequently used by the food services, industrial, support services and secretarial areas than any other areas.

17. Independent study was assigned more often by teachers in the environmental, industrial, marine and building trades than by the others.

18. Student led discussions were held more often in classes in the food services, health services, building trades and industrial programs.

19. Drill sessions were included most frequently in the industrial and secretarial course areas.

20. Demonstration was a major teaching technique in the automotive, building trades and environmental groups.

21. Individualized instruction was attempted more often by instructors in the building trades, automotive and industrial programs.

Teachers were asked to list the teaching techniques they felt were most successful for them and by which they found students learned effectively. The comments were categorized, a frequency distribution made and then the techniques were placed in rank order. The results correlate highly with the results from the usage part of the survey.

The rank order of techniques was:

A. lecture alone and combined with discussion, demonstration or laboratory

B. laboratory, shop, on-the-job training or clinical methods

C. demonstration

D. drill, practice, review sessions, homework

E. examinations, written and practical

F. use of audio visual aids

G. individualized instruction

H. discussion, teacher led, student led, small group

I. peer teaching

J. research problems, papers

STUDENT DATA

1. The students rated the teaching techniques utilized by the faculty on a five point scale as to their degree of helpfulness on learning. The nine most helpful teaching-learning techniques were:

A. work experience

B. working with a craftsman

C. participating in a demonstration

D. watching a demonstration

E. asking teachers questions

F. watching a craftsman demonstrate his skill or technique

G. individualized instruction

H. lecture

I. working on a shop problem or laboratory exercise

2. There were differences in how students valued the teaching learning techniques when compared by grade point average. There were significant differences on 23 of the 39 items. The higher the reported grade point average of the student the higher they rated activities such as taking a test, lecture method, performing an experiment or shop exercise, working on a project by self and watching a craftsman demonstrate his techniques. D level students had the highest means on the repetition-study dimensions such as doing exercises in the workbook, answering questions in text and also on the value of audio visuals, movies, slides, etc. The "D" students recognized that they needed to utilize or could utilize visual modes of learning not just auditory alone. They also saw the need for reinforcement and repetition. They probably had deficiences in investigative skills and in the traditional study skills.

3. The number of semesters in attendance brought very little change in how students rated the items. There were only two significant differences, on the use of the textbook and on doing a project by self. Students who had been in attendance longer, probably knew the subject and the resources much better and were more confident in doing a project by themselves.

4. The students at the six VTIs have different perceptions of the value of the teaching learning techniques. One explanation is that the programs, in general, differ from one campus to another. There were significant differences on 25 of the 39 items. It should be noted that students across all institutes tended to rate the value of the work experience-modeling-field experience activites and the study-skills-repetition-reinforcement items approximately the same and there were no statistically significant differences on these dimensions.

5. The students were classified into one of the six personality types using Holland's system. The items were compared by type. Although there were no statistically significant differences on the most helpful techniques such as

lecture, work experience, individualized instruction, group discussion, asking the teacher questions and watching a craftsman perform, there were statistically significant differences on 32 of the 39 items on the scale. The preference of activities corresponds to the characteristics of students in each type and the environment Holland outlines each type preferring.

6. The students were classified into a high, average or low group on each of the four dimensions and total score of the Work Environment Preference Schedule and the items compared by group. There were some differences between groups; however, the personality type was found not to be a major determiner of learning style. Those high on the dimension of self-subordination and traditionalism felt that receiving good grades was more helpful than those having low scores on the scales. Rule conformists tended to prefer more impersonal types of instructional activities such as working on an exercise in a workbook, and on programmed instruction.

The students who were more conforming to the bureaucratic structure tended to prefer the less personal techniques and those involving some type of hardware such as video tape and the computer while the non conformist were less accepting of the newer types or innovative types of instructional programs.

7. The students attitudes toward career choice were measured by the CMI attitude scale. Three dimensions of the scale were compared. Those who were high on the Decision factor preferred to have hands on type of experiences rather than vicariously talking about things. Those high on the Intellectual dimension found activities such as homework, performing a shop or lab exercise, having actual work experience, lecture more helpful than those scoring lower.

They probably had more positive attitudes toward instructional techniques because they could see their relevance to their career choice. In general, on the total scale, the more positive their career attitudes, the more valuable they saw the instructional process.

8. The Cognitive style of students although not a major dimension in the preference of teaching learning techniques did differentiate between groups on certain dimensions. Field independent students preferred more structured and traditional methods than did the field dependent students. They found homework, written and practical exams and reading the textbook more helpful than field dependent students.

9. Rotter's Internal External Scale was used to measure the students' Locus of Control. Locus of Control did not prove to be a construct that had a major relation to the student perception of teaching learning techniques. Internals found more helpful having work experience, and writing research papers. Externals preferred group experiences such as working on a shop exercise or laboratory experiment with a small group of students. These differences would support Rotter's social learning theory.

10. Students who had a more positive attitude toward evaluation tended to rate the study-repetition-practice dimensions as more effective learning techniques than those who have a more negative attitude toward evaluation.

11. There were sex differences on 26 of the 39 items. Women tended to be more positive towards the teaching learning techniques than men. They rated 24 of the 26 items significantly more positively than males. Males only rated working on a project by myself and performing an experiment or shop exercise more helpful than women.

12. The work status of the student had little effect on their rating of the teaching/learning techniques. Students who worked full time were more positive about giving reports and answering teachers' questions than students who were not working or working only part time. Those working full time might have had more self-confidence and if working in a job related to their field, more knowledge about the subject.

13. Older students tended to view the teaching/learning techniques more positively than younger students. Younger students felt more strongly about receiving good grades and lecture while older students viewed the study-reinforcement items more positively.

COMPARISON OF VIEWS OF TEACHERS AND VIEWS OF STUDENTS AS TO EFFECTIVE EFFICIENT STYLES

1. There is an agreement between the faculty and students in the institutes that hands-on type of experiences are very effective.

2. Students rate as helpful in the learning process the most frequently used techniques by the faculty.

3. There is some correspondence between the learning style of students and the instructional style of teachers when compared by Holland's six categories.

4. Both the teachers and students rate low the techniques related to the Behavior Control Model. Teachers and students have had limited exposure with hardware such as video equipment and the computer and software such as programmed instruction. Teachers prefer the activities and roles related to the Rational Model while students prefer more Discovery Learning and Social Interaction Models of instruction.

RECOMMENDATIONS

The findings of the study suggest the following recommendations.

1. The faculty might want to explore other ways to increase student participation, such as:

   A. work experience through cooperative education or a similar apprenticeship program

   B. participation in activities with craftsmen both in and out of school

   C. more active use of group discussion methods

   D. more teacher time with individuals and small groups

   E. maintaining an informal relationship with students

2. The lack of use of field trips by the least and most experienced faculty could be addressed through a preservice or an inservice program. Field trips might also be reorganized to more fully complement classroom instruction or the students' career development. For example, field trips may be classified according to the following categories: career awareness, a trip that introduces the student to a wide variety of related and ancilary positions; career exploration, a trip or series of trips that might focus on several related occupations and; career preparation, a series of trips (program) that would place the student as an apprentice with a skilled craftsman.

3. There were a number of teaching techniques that most faculty used infrequently. A series of inservice programs could be initiated to acquaint faculty with:

A. the various uses of video and video tape equipment

B. different types and sources of programmed instruction available

C. skill development in methods of small group discussion

4. The use of the traditional teaching techniques sometimes have limited application in assisting students in their career development. An increase in activities such as career awareness, career exploration, value clarification and decision making skill development might assist students in making decisions about specific careers and in the understanding of the implications of those decisions.

5. Younger students in the sample seemed to prefer many techniques that are associated with a dependency of others in a group. Consideration should be given to establishing a number of clearly defined tasks or assignments that must be done independently, e.g., projects, reports, oral presentations, as a way of increasing their self-confidence and self-reliance.

6. There seems to be some desparity between faculty and student perceptions of the evaluation procedures presently in use. There are a number of different techniques that provide for increased student involvement and yet allow the faculty to maintain their academic standards. One alternative which has been found to help students see a learning role in the evaluation process is to provide immediate feedback by means of programmed instructional material.

7. There is some evidence that learning style of students and the learning environment of the classroom are important factors in the teaching/learning process. Workshops could be held to look at some of the recent research and applications on different types of learning styles and learning environments.

8. There should be continued research on the teaching/learning process, especially in terms of specific programs, innovative practices, and specific instructional techniques.

APPENDIX A

TEACHER FORM

Dear Faculty Member:

We wish to ask your cooperation in participating in a study of teaching techniques used in the Vocational Technical Institutes. The study is the third phase of a study on learning. You may have received copies of reports of the previous phases: "Principles of Learning and Instructions" and "Learning Research and Principles as Applied to Classroom Teaching." The studies have been sponsored by the Bureau of Vocational Technical Education of the Department of Educational and Cultural Services of the State of Maine under Part C Research Funds.

In this study we are attempting to inventory the types of teaching techniques used by instructors in the Vocational Technical Institutes and to identify examples of the successful and innovative techniques used.

Pilot tryout of the instrument has indicated that it will only take 5 to 10 minutes to complete the form. Will you please participate in the study? You will receive a summary of the results.

Thank you for your cooperation,

R. J. Drummond J. Sutton
Co-Investigators

FACULTY QUESTIONNAIRE

PROGRAM

NUMBER OF YEARS OF TEACHING EXPERIENCE

COURSES TAUGHT

YEARS TAUGHT AT VTI

READ THROUGH THE FOLLOWING LIST OF TEACHING TECHNIQUES USED AND CHECK HOW FREQUENTLY YOU USE THE TECHNIQUE

		FREQUENCY OF USE		
TECHNIQUE	NOT USED	SELDOM USED	MODERATELY USED	FREQUENTLY USED
LECTURE				
DISCUSSION, STUDENT LED				
DISCUSSION, TEACHER LED				
PANEL PRESENTATION				
DRILL SESSIONS				
REVIEW SESSIONS				
SLIDES/FILMSTRIPS/FILMS				
PROGRAMMED INSTRUCTION				
RECITATION				
DEMONSTRATION				
INSTRUCTIONAL TV/VIDEO TAPE				
FIELD TRIPS				
INDIVIDUALIZED INSTRUCTION				
COMPUTER ASSISTED INSTRUCTION				
INDEPENDENT STUDY				
HOMEWORK				

TECHNIQUE	FREQUENCY OF USE: NOT USED	SELDOM USED	MODERATELY USED	FREQUENTLY USED
LIBRARY OR RESEARCH PAPERS				
LABORATORY/SHOP				
PRACTICAL EXAMINATIONS				
PEER TEACHING				
WRITTEN EXAMINATIONS				
OTHERS (PLEASE SPECIFY)				

What teaching techniques have been most successful for you to use in which students have learned effectively and you have been pleased with the results? (List techniques in order of their effectiveness)

Please describe a specific illustration of one of your successful teaching experiences: Course: Experience:

Are you trying any type of new or innovative way of teaching a course or courses? Please describe the technique or approach you are using: Course Description of teaching technique:

If you would like to be cited in the report for your innovative teaching approach, fill in the following:

NAME

APPENDIX B

STUDENT FORM

Research Project
On
Teaching and Learning

Dear Student:

We wish to ask your cooperation in participating in a study of student learning styles in the Vocational Technical Institutes. This study is being sponsored by the Bureau of Vocational Technical Education of the Department of Educational and Cultural Services of the State of Maine.

In this study we are attempting to inventory the types of learning styles that the students in the Vocational Technical Institutes utilize most often and to determine the effectiveness of these learning styles.

The accompanying instrument packet has three parts to it. Previous experience has shown that it takes approximately 15 minutes to complete all three parts. This work is to be done anonymously and will not have any effect on your present course work or grades at the Institute. We would appreciate your assistance in completing the packet.

Thanks for your cooperation,

R. J. Drummond J. Sutton

Part I

Major Program at the Vocational Technical Institute

_____

What is your estimate of your present grade point average. (Based on a 4 point scale) _____

Age _____

On the following questions please circle the appropriate answer.

Sex: Male Female

Number of semesters completed at the Vocational Technical Institute:
1 2 3 4

Are you married? Yes No

Have you ever held a full-time job? Yes No

Are you working now? Full Time Part Time Not Working

Part II

Learning Style

DIRECTIONS: There are many different ways we learn and teachers use a variety of teaching techniques. A number of ways and techniques are described by the items in this survey. Read each item and decide how helpful that particular way or technique is in assisting you to learn here at the Vocational Technical Institute.

There are five possible answers to each statement. The undecided answer should be used only when you have no opinion. You are to mark your answers on the IBM answer sheet accompanying this test instrument. Using the response key below, blacken the space on the answer sheet corresponding to the number that best represents your feelings.

For example:
Blacken 1 if hinders or prevents learning
Blacken 2 if not helpful
Blacken 3 if undecided
Blacken 4 if somewhat helpful
Blacken 5 if extremely helpful

Response Key

1	2	3	4	5
Hinders or Prevents Learning	Not Helpful	Undecided	Somewhat Helpful	Extremely Helpful

Way or technique

1. taking a written test
2. viewing a filmstrip
3. listening to the teacher talk about a topic
4. watching an experiment or shop demonstration
5. listening to a record or tape of a lesson
6. doing homework assignments
7. reading my textbook
8. watching video tape or instructional TV program
9. watching a movie on a class topic
10. asking the teacher questions
11. doing an exercise in a workbook
12. discussing a topic with some members of my class
13. performing an experiment or shop exercise
14. having an actual work experience
15. writing answers to questions in my textbook
16. discussing a video tape or an instructional TV program
17. answering questions of others in the class about a lesson
18. taking notes on what I am reading
19. individualized instruction with teacher
20. giving a report to my class

1	2	3	4	5
Hinders or Prevents Learning	Not Helpful	Undecided	Somewhat Helpful	Extremely Helpful

21. working on a project by myself
22. using the library or reference room
23. working with programmed instruction materials
24. answering the questions the teacher asks
25. working on an experiment or shop exercise with a small group of students
26. receiving good grades
27. visiting a work site
28. taking a practical test
29. working with the computer on gaming or simulation exercises
30. watching my performance on video tape
31. listening to guest lecturers
32. watching/listening to an overhead slide and lecture presentation
33. using the computer for instructional purposes
34. receiving instruction from other students
35. being tutored in academic areas where a deficiency exists
36. meeting with other students in small groups for discussion of academic topics
37. writing a research paper on a particular topic
38. watching a practicing craftsman demonstrate his techniques and skills
39. working with and observing a skilled craftsman in an actual work environment

The following two questions are to be answered in the space provided.

What other learning styles are helpful for you?

What is the most effective and efficient learning style for you?

APPENDIX C

SUCCESSFUL TEACHING EXAMPLES

Advanced Cooking: Exposed to large feeding assignments such as feeding the Maine legislature at certain functions.

Air Conditioning: Demonstrating how H_2O will boil at room temperature (70° F) in a low pressure area. This illustrates how moisture can be removed from the A/C system during the evacuating procedures.

American Literature: Relevancy-past-present-future.

Anatomy and Physiology: Recognition of bone markings on real specimens.

Applied Technical Drawing: First eight weeks is traditional lecture and student activity, remaining eight weeks student effort in major terminal project with individualized contact and the student met the objectives of the course when his terminal project is completed and no longer attends class.

Automated Combustion: From studying texts and drawings subject appears to be complex, but when you can take an individual into the shop and explain each piece and associate to drawings in text, the speed and the understanding of the student is extremely good.

Automotive: in teaching construction of, reading of and the use of graphs, the automotive instructor and I co-taught the unit so our discussion centered around the uses of graphs in the automotive field, giving an assignment in graphing which was corrected by us simultaneously.

Automotive transmission: Using the four step method: (A) prepare, (B) present, (C) tryout, (D) follow-up this complex course is successful with 120 hours of lab.

Automotive Tune-up: Lecture on oscilloscope design and operation, then demonstration of same on a simulator followed by a demonstration on a live car. After that the students use scope several times for familiarity.

Basic Circuits: Using the modular system allows for flexibilitiy in presentation by meeting instructional objectives in a minimum time frame.

Basic Science: Students preparation for specific laboratory experiments by completing written LAP then follow things in laboratory session by identification on laboratory specimens, torso and whenever possible on a classmate. One outstanding experience was with the study of the heart, animal heart and human hearts were utilized.

Blueprint Reading: The incorporation of perspective drawing to help students realize the depth of three view drawings.

Use of plans designed after extensive study in projects of engineering applications in real industrial situations. Students can question all of the "whys" as well as the "hows" in both the design and the drafting.

A.Rudder bearing application to "debug" conditions on the R/V Albatross IV (Redesign of bearing box and internal parts. B. Structural redesign of fish pen concept aboard the trawler "Winchester".

Building Construction: Layout common rafter teacher demonstration with review followed with homework-within a day or so break class into small group and have them layout several different common rafters in shop on pieces of 1" x 6" lumber.

Business Mathematics: The class was struggling with the concept of determining mark-up based on selling price. When the light went on for one student, he anxiously assumed the role of the teacher and he explained the concepts to his peers as best he could. I was able at this point to work individually with class members.

Carburetors and Fuel Systems: Adjusting carburetor to overrich settings and have student demonstrate how to correct and explain why the CO and He readings were too high.

Carpentry: In laying out rafters the process is demonstrated and then each student lays out a rafter in shop and has the instructor check for accuracy.

Clerical Office Procedure: We used an office simulation set-up in the second semester of clerical office procedures.

Communication: Labor law case study methods.

Composition: Students in general learn more quickly when you establish rapport with them personally and when you can point out errors as they make them. The less the time span between work and the correction of the work, the quicker the learning process.

Indivdual conferences with students in a writing laboratory situation have resulted in almost dramatic improvement in quality of content, organizational skills, sentence structure and mechanics.

I have tried to relate the work in composition to the trade areas of the classes by encouraging research on topics that contribute to their understanding of their professional interest. Students use trade journals as source material for writing summaries and business letters.

Culinary Arts: Preparation of a full scale budget for 250 people taught through class participation and demonstration.

Diesels: By having each student determine bearing clearances on a disassembled GM 671 engine, diagnose malfunctions and recommend the necessary corrections. Explain how pump works in classroom. Make them then tear down and reassemble.

Drafting: Peer teaching for bilingual students.

Electric Shop-Lab: Example: Installing residential 100A electrical service. Mechanical installation skills are taught in lab while necessary related knowledge from other courses.

Trouble Shooting for Electronics: Students develop a functional block diagram of a system that is operational. Once it is developed insert a trouble and the students can understand.

Describe a circuit (lecture). Demonstrate the circuit, then have students set it up and work on it.

English: Small groups of students read and evaluate each others written work on the basis of unification, support, coherence and sentence skills. Constructive criticism from peer group very effective teaching device.

Each student is encouraged to apply principles of communication to his major field of study.

Food and Beverage Purchasing: Projects students made for open house.

Gas, Humidity and Aerosol Therapy: Performance of procedure to set up oxygen adminstration devices using a student as a patient (role playing) another student as an evaluator and another student as a technician performing procedure.

Heating: Installation of a residential oil-fired boiler, copper tubing piping with baseboard radiation and convectors, oil tank and piping and electrical installation to all controls.

Heat Loss Calculation: Extensive use of charts and instructions taken from the manual being used.

Hotel-Motel Restaurant: Spice test. Use spice separately in a piece of pork. Cook and try.

Industrial Waste Treatment: Integrated lecture followed by investigation over a three week period to determine rate constraint for bio chemistry of a specific sewage by a series of BOD determinations, followed by curve plotting (least squares) and statistical evaluation of individual and class results.

Insurance: After discussing an area in insurance, an individual from the field of insurance was invited into class to point out what it is really like working in that area.

Lecture on application for insurance. Example on overhead. Have student fill out actual application form.

Keypunching: By having the hardware available for hands-on-experience is an effective method.

Landscaping and Plant Maintenance: The first 6 to 8 weeks of the semester are spent developing basic skills; i.e. pruning, transplanting, sodding, etc. After these skills are acquired the students are given tasks as groups utilizing these skills. In this way the skills are practiced, but more importantly the students work together to accomplish the task within a time limit. The working together to attain a common goal.

Learning Resources: Vocabulary training is accomplished with programmed instruction and sight word Tachistiscope drills. In remedial communication skills, successful approaches vary tremendously from student to student. Among the most successful in reading are the paced reading films, individual conference work. Once problem area has been identified, teacher prepares materials [illegible]ed specifically for the problem.

Show me the instructor that can rank teaching techniques, and I'll show you an ineffective teacher. Teaching techniques must be matched to the specific learning task, the entry level of the student and the particular cost effectiveness specified for that task or course. The most accurate answer I could give you is, I've found the Gagne/Briggs strategies the most applicable to teaching in a VTI.

Marketing: Presenting material on the procedures involved in closing a sale. then having an interested student do an internship with an experienced salesman.

Math: Teaching basic math and trigonometry without utilization of algebra. A final exam given each student, directed at his area(s) of weakness as demonstrated by hour exams during the semester. This directs each student to his particular weakness and reinforces the related principles and incidentally improves his grade.

Mechanic: Study of graphic vs. analytical methods of solving problems in statics, advantages of each revealed through the students own experience.

Medical Lab Analysis: demonstration finger puncture.

Medical Surgical Nursing: Drill sessions. Students responsible for independently researching / reviewing various procedures / independently researching/ diseases, etc. as they arise in their clinical experience; drilled before caring for patient/information corrected or reinforced in group settings.

Medical terminology: Use of programmed text by Smith and Davis allows great flexibility in use of class time.

Navigation: Successful teaching to me is when a student after 2 years at the VTI goes out and successfully passes his Coast Guard examination.

Nursing Fundamentals: Simulated bed making and bathing laboratory using students as patients before going into a hospital for the actual bedmaking or bathing of a hospital patient.

Nursing Theory: Video tape of a procedure after having had a lecture of the principles and discussion of the "whys". Then go into lab and manually return the performance of the procedure.

Patient Care Conference: senior experience. Panel presentation-each student is assigned a particular part of the conference on a patient chosen by students and instructors. All aspects of care are considered and students are able to correlate material taught in other courses and utilize this "knowledge " in patient care. Conferences are held weekly-3 hours in length.

Personal Finance: Shoping research: Commodities, goods, value $100 or more. A. Preshop-investigate B. Negoiate price if possible C. finance

Personnel Management: A group of four was responsible for some work in T.A. They made audio-visual aids to demonstrate the T.A. experience in I'm O.K., You're O.K. and Born to Win.

Pharmacology: Many patient care plans were arranged to include several different diagnoses and several different drugs under the same classification. The students use these plans to look up the drugs and classify them. They also could relate them to the diagnosis and to other medications used.

Pharmacology: preparation and administration of oral medications.

Physics: Teaching color processes using Singerman's Color apparatus and Balinken-Dwight Filter graph to differentiate between the additive and subtractive process.

Plumbing and Heating Lab: In the fall students come into an empty plumbing and heating lab. Here they assemble all components of their particular course as they study it during the year and by spring each student will assemble a plumbing and heating display demonstration for open house.

Plumbing and Heating Math: Effective method is lecture, students questions,

in class oral work followed by homework assigned often begun in class. Examinations at the end of each unit of study.

Psychology: field trips which correspond to unit topics for example trip to funeral home for unit on death and dying.

Residential Electricity: Say, see, do people tend to remember what they did in training rather than what they were told in training, thus people should be trained under conditions that are as really like the actual job and the actual situation where possible.

Rules of the Road: Discussion - teacher led and than student led. Point in question "If towing lights are carried aft and consequently become lights showing all around the horizon, are the two amber 12 lights displayed aft?"

San. Chemistry: Field trip to collect sample followed by laboratory analysis.

Shorthand: Most students feel at first that shorthand seems impossible to learn. Through constant motivation and determination on both teachers and students, learning becomes a rewarding experience.

Using Century 21 Shorthand the students seem so at ease, learn faster and obtain much faster speeds in taking dictation and transcribing.

Small Business Management: Using a film on interview techniques to stimulate discussion and then rerunning.

Social Problems: Students study themselves. Students construct a questionnaire under guidance of the instructor. Data were collected and analyzed using punched cards. All student based.

Sociology: Discussion of contemporary social problems. Field trips to various institutions. Students observe, implement and return to class to discuss findings.

Strength of Materials: Reading assignment (Centroids-center of gravity) Demonstration. Balance planes. Triangle,square, rectangle math involved - blackboard or overhead. Problems done outside - questions - problems - test.

Speech: Interviews . . . one person playing role of employer and the other applicant.

Technical Writing: Selection of, research for and construction of long technical report as class project.

Turbines: Starting, placing on line generators and securing same. Raising steam on boilers and cutting in on line parallel with other boiler.

Wastewater Technology: After lecturing, followup by a combination lab and shop instruction, then finally a field trip.

Wood harvesting: Practical exercises in shop and in the field. A "hands on" type experience, I feel is the best way for a student to learn and retain the information presented.

Practical exam: 2 mile cross country hike through territory no one in the class had ever seen before.

APPENDIX D

INNOVATIVE TEACHING PRACTICES

Advanced Shorthand: Two approaches are being used: Gregg Shorthand and Century 21. The students are responsible for material in both books. The instructor works with one group while the other is working individually with a tape. - Northern Maine VTI

Air Conditioning: An instructional video tape is being prepared to cover the complete unit of basic air conditioning (30 hours). - Central Maine VTI

Allied Health Sciences: A clinical skills laboratory is being developed to facilitate the acquisition and mastery of concepts and skills through the provision of association with concrete reference stimuli and opportunities for equivalent and/or analogous practice behaviors.

The objectives are:

1. to provide successful experiences at frequent intervals and varied cognitive stimuli to accommodate individual styles of learning.
2. to facilitate concept learning by minimizing abstractions.
3. to provide analogous practice opportunities to ensure specified levels of performance and develop student confidence in achievement of psychomotor and/or manipulative objectives. - Southern Maine VTI

Architectural and Civil Engineering Technology: The use of the overhead projector with transparencies of tables marking the proper steps of a procedure has been helpful. Providing students printed sketches has improved their understanding. Sometimes incomplete sketches are provided the students and they are asked to fill in the information while watching it on the board. - Central Maine VTI R. F. Bastow

Automotive, Engine: Students disassemble (systematically) a single cylinder, small engine and then inspect and measure it and then reassemble it in a classroom setting. - Southern Maine VTI E. D. Andersone

Automotive Technology: Students are allowed to proceed with hands-on laboratory work before they receive full instruction and demonstration pertaining to the job. Of course, full consideration is given to safety practice. As mistakes are made by the students during assembly/disassembly, these problems are pointed out and the alternate methods discussed and demonstrated. - Southern Maine VTI Douglas Gray

During a demonstration, the instructor installs some unit incorrectly to see if the students notice the mistake. - Southern Maine VTI Thomas Heald

Basic electricity: A pre course exam is used to find out the entry level of the students. The final examination covers the same questions. The comparison helps the instructor to evaluate what each student has learned or missed. - Southern Maine VTI

Basic Mathematics: Students are provided individualized help on units. The student does not move on to the next unit until he or she achieves 80% on the unit test. The students can take any test whenever they are ready. - Washington County VTI Ronald P. Renaud

Biomedical Science: The biomedical science was a course designed as an experiment in college science education. The core of the course was tests used in modern hospital laboratories. Anatomy, physiology, chemistry and physical principles were taught in conjunction with each section and practical applications involving modern medicine shown. - Southern Maine VTI

Blueprint Reading and Drafting: Techniques are being developed to assist students with sight handicaps so that they will be able to cope with graphics in space despite the limitations imposed upon them by their handicaps. - Southern Maine VTI D. P. W.

Botany/Microbiology: Audio-tutorial methods are used to provide individualized instruction for students. - Southern Maine VTI

Business: In the business course, students are required to plan their own business from the start, they are also required to do written reports which illustrate different management principles. Case problems are discussed. - Southern Maine VTI

Carburetors: The instructor combines lecture and overhead transparencies to show students the circuitry of carburetors. Students are assigned a single barrel carburetor which they disassemble in class and study it as a group and then they reassemble the carburetor. After 21 hours of this experience they are then ready to overhaul their first live carburetor. - Southern Maine VTI James Johnson

CETA MTO and SU: A programmed learning center is utilized. - Southern Maine VTI

Clerical Office Procedure: The A La Carte Enterprises Office Simulation is utilized. The primary goal of the simulation is to develop and improve secretarial, clerical, administrative, supervisory and human relations skills in a realistic business setting. - Northern Maine VTI

Communications: Video tapes are used to help students in developing interviewing skills and to provide a more realistic experience and give them immediate feedback. - Washington County VTI

Consumer Economics: Students are given frequent assignments to do out of class seeking comparisons between products and data about specific products or services. Ten outside assignments are given to the students during the semester. Some are done as team assignments. Their work is counted as 70% of their final grade for the course. - Northern Maine VTI

Criminal Law: The instructor makes use of the textbook as well as study guide for the exercises which cause students to repeat the assignments and do some further research in given areas. - Southern Maine VTI

Developmental Studies: Individualized instruction is provided students in study skills. Students who possess adequate reading levels but are still failing their major program may come in for personal tutoring and for study skill development. They can seek help whenever in need. Comprehension, vocabulary and spelling are taught to some extent through trade journals. Spelling is taught through visual-memory exercises (tachistoscope)as well as through auditory training. - Washington County VTI Ronald Renaud

Diesel: Efforts are made to help students take pride in their work so they care about what they are doing and do a good job.

Diesels, Electricity: Students are required to research all the absolutely latest changes, techniques and innovations that industry makes and forcefully present this latest information. By this way, students can compare new methods with old and are encouraged to express their thoughts on these and agree or disagree with these concepts. - Southern Maine VTI

Dining Room: Students are given experience in the operation, preparation and serving of varied meals and menus under the instructors direction. - Southern Maine VTI

Electronics: A practical hands-on approach is used in the laboratory exercises. Actual two-way communications systems are used for trouble shooting and repair. Students are graded on actual work. A shop situation is set up and it is determined if the student is actually producing enough to make a profit for his employer. - Washington County VTI

English Compositon: A tailored approach is utilized to individualize classes and a constant attempt is made to innovate meaningful approaches to satisfy the needs of students. - Southern Maine VTI

Diagnostic tests are used to identify the needs of individuals in grammar. They are given individualized assignments. - Southern Maine VTI

Environmental Control Technology: The students are asked to prepare a set of examination questions over a section of the textbook that has been assigned and their lecture notes. They find that they can more easily assimilate the material when they use this technique. - Eastern Maine VTI

Fluid Power: The examination is administered at the first meeting of the class and again at the end of the class. Part of the student's grade will be based upon his increase of knowledge of the material presented. - Southern Maine VTI Ronald Gabaree

Food Services: Students are required to do certain duties each day at the snack bar, such as grill or short order cooking. They also have to serve as cashier. This experience gives the students the ability to pick up speed which is needed in order to perform on the outside in this type of business. - Washington County VTI Norman R. Sprague

Fuel Systems: Emissions Control Section: A programmed slide program is utilized with tapes. - Northern Maine VTI

Heating Laboratory I: Students are given a lecture on each part of a domestic gun-type burner. Then the students are required to dismantle the parts of an assigned oil burner. When the burner has been completely dismantled, they are asked to exchange burners and reassemble it. Then they are asked to put the burner through a performance test. - Northern Maine VTI

Insulation: The following procedure is used to teach students about insulation:

1. Students do research in the library on insulation.
2. They write a paper on insulation.
3. The instructor lectures on the topic.
4. The instructor demonstrates the proper way of installing insulation.
5. Students install insulation.
6. Mathematics and Science teacher discusses the theory and R factors of insulation, properties of it, moisture, condensation and vapor barriers, etc. - Washington County VTI Reginald Roy

Keypunching: Students are assigned outside projects that are available. The experience provides students an opportunity to learn from doing different types of jobs, provides an opportunity to develop leadership skills and motivates them to improve their skills.

Marketing: There is a "24" hour internship for students which permits them to observe theory in practice. This also acts as career education and allows the student to learn first hand entry level requirements for a variety of positions. - Kennebec Valley VTI Gary V. Stevens

Mathematics: Students are guided in their learning to make honest evaluations between the "need to know" information and "nice to know" information as it relates to the real world.

Many students have trouble, for example, dividing a decimal number by a decimal number. If they honestly evaluate this operation, they will find it almost never occurs in everyday life situations. If students realize this, they almost never question why they should learn how to do it which means they don't bother to set up negative defense mechanisms. They develop a more positive attitude toward learning then in mathematics and science areas. - Washington County VTI D. Rowe

Medical Surgical Nursing: Students are placed in as realistic situation as possible. Outside speakers discuss the diseases being taught. Real photographs of the diseases are utilized. Field trips and visits are arranged so students get first hand experience of the various agencies they will be working with and work with people who have the diseases discussed. - Eastern Maine VTI

Modular Basic Circuits, A. C. Circuits, Switching Circuits: A modular approach is utilized to teach some of the basic concepts in electro-mechanical technology. A flow chart is provided to illustrate how the system operates. - Central Maine VTI R. G. Ouellette

Nursing Courses: An independent study laboratory was developed to prepare students for future class content. Filmstrips, readings and reports were utilized among other sources to help the students have a better background for the classes. - Eastern Maine VTI

Nutrition: Modules were developed for the course. The instructional procedures included cassette usage, group work and some lecture. - Northern Maine VTI

Oil Heating Controls: In this course the Honeywell Residential Training "OVG"slide presentation is being used with accompanying student notebooks to cover all phases of oil burner combustion, thermostats, warm air and hydronic controls. - Washington County VTI Ralph S. Ray

Pharmacology: A supervised independent module approach has been developed. There are three units, Introduction to Pharmacology, Preparation and Administration of Medicines,and Drugs. Each unit contains an information sheet, practice sheets, some lab work and a written test at the end of each section. - Northern Maine VTI Dolores Roix

Physics: Faculty members are seeking National Science Foundation funding to get computer terminals with plotters to make problem-solving more interesting and challenging in physics and mathematics. - Southern Maine VTI

Students are encouraged to do thinking on their own by reading and interpreting the text, solving textbook problems and analyzing laboratory situations. - Eastern Maine VTI Ronald G. Littlefield

Pretechnical Communications: In remedial communications skills, students' problems are diagnosed. Once a problem area has been identified, materials are designed specifically for that problem. Also, to develop vocabulary skills, programmed instruction and tachistoscope drills are used. In reading, self paced reading films and individual conference work are scheduled.

Pretechnical Mathematics: In the course, workbooks along with correlative cassette and videotapes are used. A student may choose to:

1. use the workbook only
2. use the book and audio cassette tape
3. use the book and videotape
4. work in a group with the instructor

A group of behavioral objectives have been set for the course. The student is allowed to go at his own pace. - Central Maine VTI

Residential Electricity: The two hours of code and theory and four hours of shop is combined. The topics are covered in the two hour classroom period in mock up situations. The students have a block of six hours to cover the material. - Washington County VTI C. E. Smith, Jr.

Rules of the Road: The text is supplemented by "sea stories", live incidents of occurrences that have happened to the instructor and his vessels in 30 years of actual sea going experience. - Southern Maine VTI Capt. Arthur D. Hall

Social Science: Field research procedures are employed. Students make tape recorded interviews on topics relating to social policy issues such as the role of technology in social change. - Southern Maine VTI

Technical Communications: Students are asked to set up a test experiment and then write a report analyzing the test. Then they give an oral presentation to the class using charts, etc. to discuss the test. The test experiment involves a test car, for example, before and after tune up, etc. - Northern Maine VTI

Technical Writing: A three level approach is presented. Each succeeding level decreases in complexity of detail and increases in explanation of the task. Students are given the choice of how many levels of detail they need for learning. The three levels are:

Level I: Presentation of broad concepts: lecture, demonstration and slide format

Level II: Presentation of concept with elaborate demonstration on video tape

Level III: Presentation of step by step instructions designed to help the students cope with unfamiliar sub-concepts with paper and pencil individualized programmed format being presented. - Central Maine VTI Carl P. Ventrone

Welding: In the welding course students are provided hands-on instruction. Modeling is used. They are shown and then asked to do. They must do their work to industrial specifications including following safety rules. - Washington County VTI

Writing: Students are involved in a writing laboratory. Then there is a session in which the student and teacher rate the essay assignment. The approach was developed by Jack Kates, author of "You Can Learn to Write." - Eastern Maine VTI Patrick O'Neill

APPENDIX E

EXAMPLES OF OTHER LEARNING STYLES HELPFUL TO STUDENTS

RANDOM SELECTION OF STUDENTS' COMMENTS ON LEARNING STYLE VIEWED AS MOST HELPFUL

Question and answer periods, lectures, working on project myself

Private tutoring not more than 30 hours a week for school at a slower pace

On the job training

Practical experience

Working in perspective job

Mostly experience on working in shop

Practice

I like the relaxed atmosphere in the classroom

A relaxed classroom appeals to me

On the job training

Outside skills in your field of study

Keeping on an informal basis with the teacher

Doing the work on your own and discussing any problems I might have with the instructor

Working with skilled people in your field with the incentive of making money for those who are willing

Being out on the job, working with skilled craftsman, actual job experience

Good teachers

Being away from actual education type process (school) has proved to be a very valuable learning style

Good teachers that are interested in their subject area and enjoy helping people learn

All hands on work to apply theory

Learning by my mistakes

On the job work, doing what one has been learning while one is still learning

Having sufficient supply of books needed for course in school bookstore

Studying what even I take after class and study at home in the same day

APPENDIX F

EXAMPLES OF MOST EFFECTIVE AND EFFICIENT LEARNING STYLES REPORTED BY STUDENTS

EXAMPLES OF EFFECTIVE AND EFFICIENT LEARNING STYLES LISTED BY VTI STUDENTS

Taking part in a project or experiment

Working with and observing a skilled craftsman in an actual work environment

Getting exposure to the field of work

Taking notes and listening to the teachers

On the job training

Class workbook exercises

Practice

Doing exercise in workbooks and asking teachers questions

Having someone working with me

To go out and do it

Lecture type classes

Listening to the teachers and filmstrips

Doing homework assignments and workbook exercises

Actually doing a job

On the job training or lab work

Asking questions

Seeing pictures of the way something is hooked up or how something is supposed to look when I am done

Hands on training - doing the work for yourself

On the job training

Work experience

Lab work

Working in lab with students who know it

Demonstration by person who knows equipment well then go do it on your own receiving help only when badly needed

APPENDIX G

HOLLAND'S
SIX PERSONALITY TYPES

Personality
Holland's Six Types

Type	Characteristics
REALISTIC	Prefers realistic occupations or situations
Examples:	avoids activities demanded by social occupations
automotive mechanics	or situations
building construction	uses realistic competencies to solve problems
culinary	perceived strengths in mechanical and athletic
heating	ability
sheet metal	values concrete things or tangible personal
	characteristics - money, power, status
	asocial, conforming, frank, genuine, masculine,
	materialistic, natural, normal, persistent,
	practical, stable, thrifty, uninvolved
INVESTIGATIVE	Prefers investigative occupations or situations
Examples:	avoids activites demanded by enterprising occupations
electronics technician	or situations
computer programmer	uses investigative competencies to solve problems
electricity	at work
waste water	perceived as scholarly, intellectually self-
radiology	confident, having mathematical and scientific ability
medical lab	but lacking in leadership ability
	values science
	analytical, cautious, critical, curious, independent,
	intellectual, introspective, methodical, passive,
	precise, reserved

ARTISTIC	Prefers artistic occupations or situations
Examples:	avoids activities demanded by conventional occupa-
English teacher	tions or situations
architect	uses artistic competencies to solve problems at work
artist	perceived as expressive, original, intuitive,
designer	feminine, nonconforming, introspective, independent,
	disorderly, having artistic and musical ability
	values esthetic qualities
	complicated, emotional, idealistic, imaginative,
	impractical, impulsive, original
SOCIAL	Prefers social occupations and situations
Examples:	avoids activities demanded by realistic occupations
food service manager	and situations
sociologist	uses social competencies to solve problems at
home economist	work and in other settings
practical nurse	perceived as liking to help others, understanding
social science teacher	of others, having teaching ability, and lacking
health services	mechanical and scientific ability
	ascendant, cooperative, feminine, friendly, generous
	helpful, idealistic, insightful, kind, persuasive,
	responsible, sociable, tactful, understanding

ENTERPRISING	Prefers enterprising occupations or situations,
Examples:	avoids the activities demanded by investigative
salesman	occupations or situations
manager	uses enterprising competencies to solve problems
retail merchant	at work and in other situations
contractor	perceived as aggressive, popular, self-confident,
buyer	sociable, possessing leadership and speaking abilities
distributive education teacher	and lacking in scientific ability
	values political and economic achievement
marketing	
	acquisitive, adventurous, ambitious, argumentative,
personnel	dependent, domineering, energetic, exhibitionistic,
	flirtatious, impulsive, optomistic, pleasure seeking,
	self-confident, sociable, talkative
CONVENTIONAL	Prefers conventional occupations or situations and
Examples:	avoids the activities demanded by artistic occupations
keypunch operator	or situations
file clerk	uses conventional competencies to solve problems at
typist	work
secretary	perceived as conforming, orderly and as having
accountant	clerical and numerical ability
	values business and economic achievement
	conscientious, defensive, efficient, persistent,
	practical, calm

APPENDIX H

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